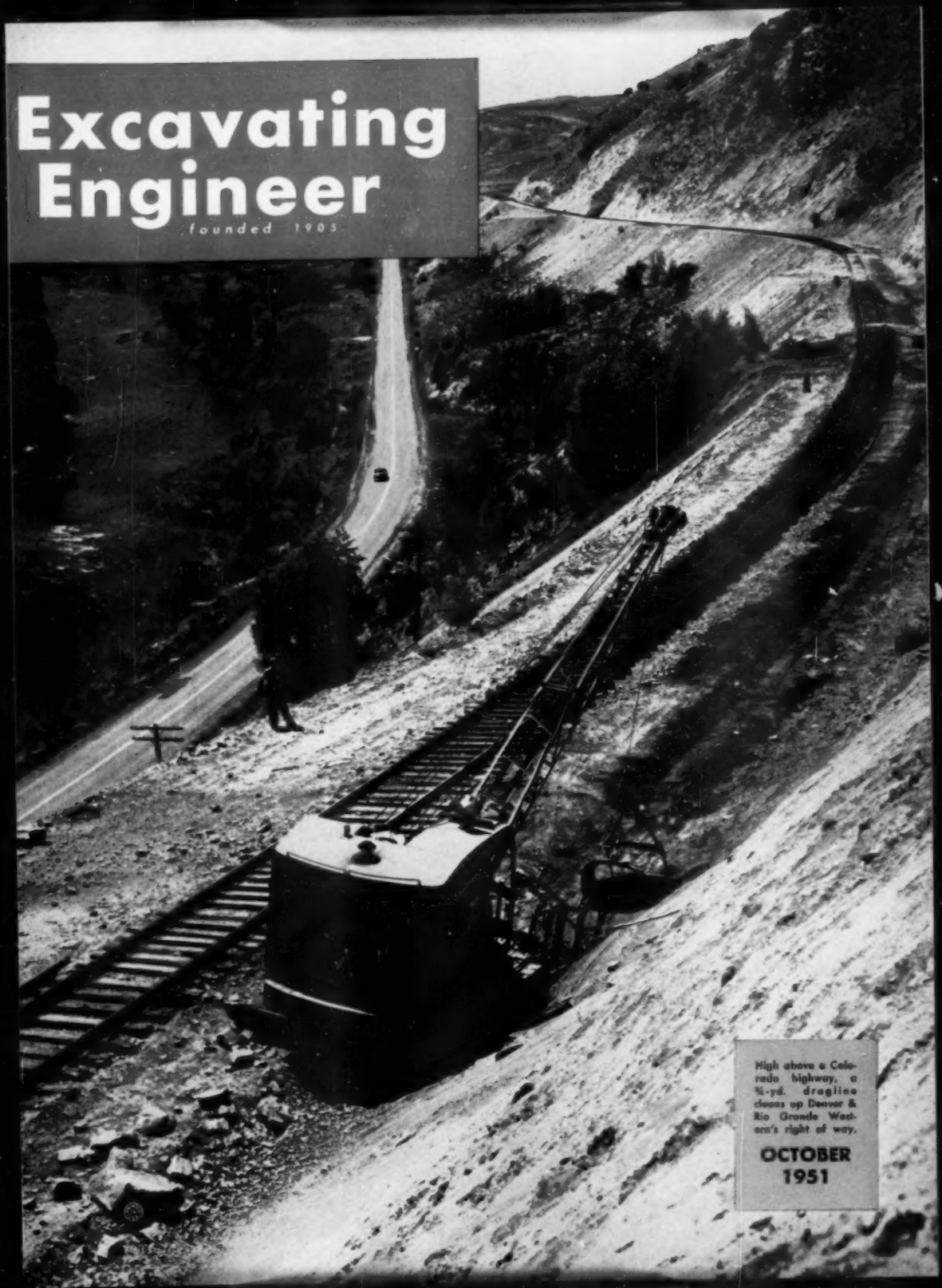
Excavating Engineer

founded 1905



High above a Colorado highway, a ¾-yd. dragline cleans up Denver & Rio Grande Western's right of way.

OCTOBER 1951

Outstanding

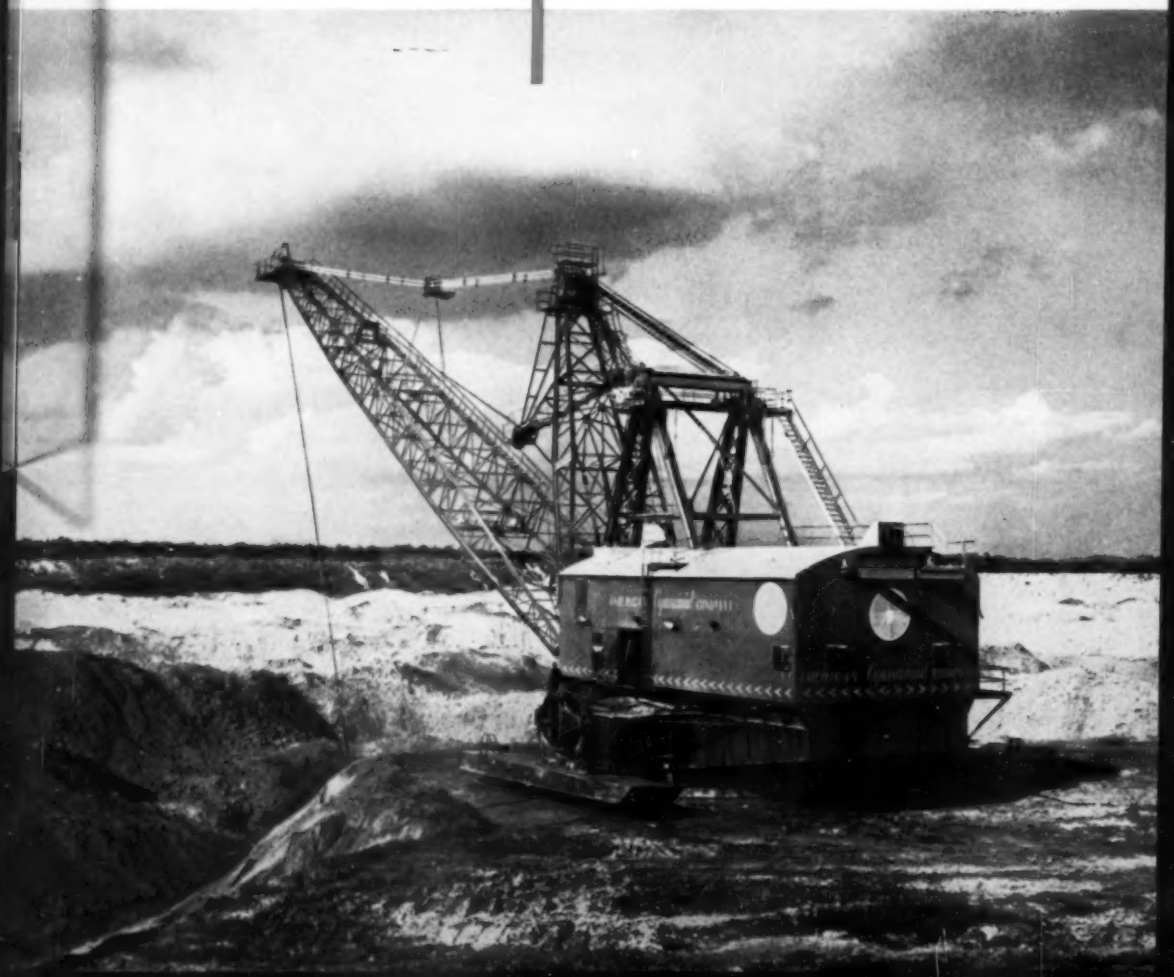
BY EVERY STANDARD OF COMPARISON

Use any yardstick you wish to measure the worth of an excavator — range, capacity, speed and ease of control, durability, low maintenance — or that all-important criterion: steady, big-output performance. You'll find that Bucyrus-Eries rate "outstanding" on all, because their advanced design and construction is backed by unequalled experience in building excavating machinery for use all over the world. A complete line of shovels, cranes, draglines, stripping shovels and walking draglines from 2½ to 36 cubic yard sizes provides a machine to fit any job requirement.

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

144LS1C



This advertisement appeared in leading newspapers September 12. It is the first of a series in behalf of a modern highway system.

We Must Face the Highway Crisis Now

—*there is only one real cure!*

ONE of the greatest home-front threats to the welfare of every American is the congestion on our highways today.

It is not only a menace that costs thousands of lives in needless accidents and millions of dollars in wasted time every year—*it is a peril to national security!*

Without motor transportation the nation would stagnate. It has become the lifeblood of America's economy. The highways are its arteries—and they are hardening fast!

Remember these facts

Motor transport now carries 80% of all interstate passenger traffic—takes more than 50% of all workers to their jobs.

It speeds 90% of all foods to market—hauls 75% of all general freight.

It is the swift plant-to-plant conveyor of raw materials, parts and subassemblies that keeps America's mass-production lines going—that makes America's unprecedented prosperity possible.

Roads are the bottleneck

To keep America moving today requires the daily use of almost FIFTY MILLION motor cars, trucks and buses—more motor vehicles than all the rest of the world possesses!

Yet this vital transport system is now jam-packed into an obsolete highway system—*most of it designed pre-war to comfortably accommodate less than half today's vehicular mileage!*

And motor registrations have been soaring since the war at the rate of 3.7 million per year.

We should have action NOW!

We cannot cut this Gordian knot by restrictive laws. The crux of the problem is not the number of cars or the size of trucks—*it is too few modern roads!*

To keep our nation mobile, we must start building a new national highway system now, designed for modern traffic needs and speeds.

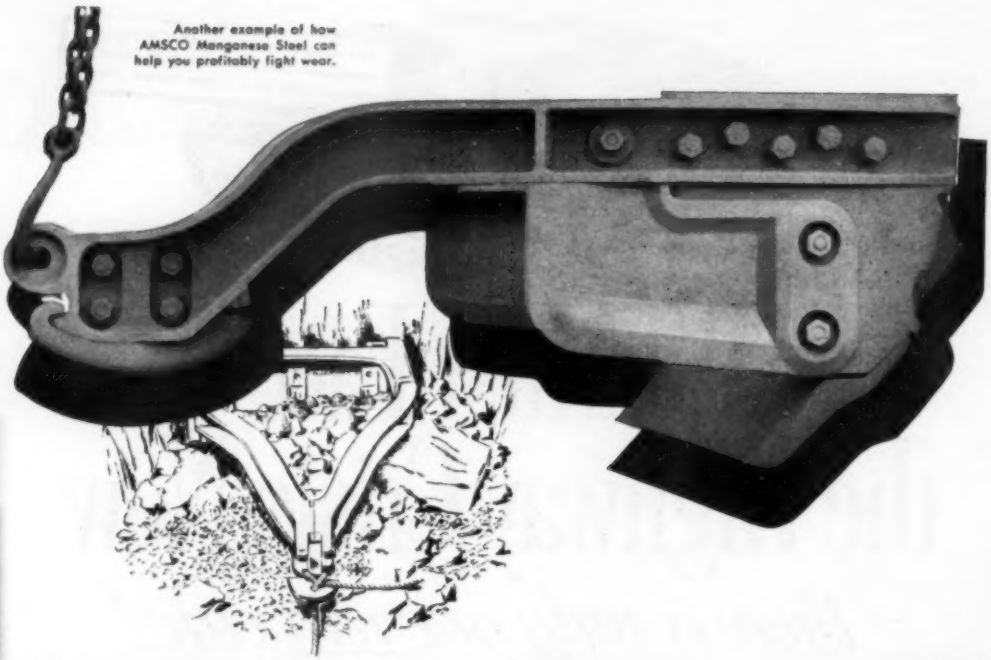
Such a modern road system is essential to our prosperity and vital to our defense in this atomic age. And we have the world's most efficient road-building industry equipped to construct it in less time than ever possible before.

The time has come when we must do something about better roads besides talk. The demand for action must come from everyone who uses the highways—and that's just about everybody.

P. W. Litchfield

Chairman of the Board
THE GOODYEAR TIRE & RUBBER COMPANY, INC.

GOODYEAR
THE GREATEST NAME IN RUBBER



Another example of how AMSCO Manganese Steel can help you profitably fight wear.

This SCRAPER cut maintenance costs 20%!

How AMSCO Manganese Steel proved tougher than a tough mining problem

One of the toughest mining operations you'll find anywhere—tough from the standpoint of how it punishes equipment—is scraping heavy, corrosive pyrite ore. For example, a California mine has a deposit of 98% pure pyrite—with a specific gravity of 4.8. Impacts and abrasion caused by this ore were making short work of the scrapers previously used . . . on the average they needed major repairs over 4 times per year.

Several years ago two scrapers of the type shown above, which are sold exclusively by Joy Manufacturing Co., were put in service. They were made entirely of AMSCO Manganese Steel, and since then they've mined *over 220,000 tons of pyrite ore — and they're still in excellent condition!* These scrapers are repaired only once a year; simple repairs involving relipping and hardfacing of wearing surfaces.

Obviously, not all mining or excavating operations are as equipment-punishing as this one . . . *but the moral is clear* . . .

WHEREVER YOU MEET A PROBLEM OF WEAR CAUSED BY IMPACT AND/OR ABRASION . . .

. . . find out about longer-lasting, dollar-saving Manganese Steel made by AMSCO . . . world's largest producer of Manganese Steel castings for all industry.

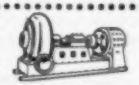
AMSCO controls impact and abrasive wear in 5 basic industrial operations:

Power Transmission

Mining and Excavating

Transportation

Crushing and Pulverizing



Materials Handling

Brake Shoe **AMERICAN MANGANESE STEEL DIVISION**

373 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

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Excavating Engineer

founded 1905

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The Copper Mine at Mineral Creek — by Robert J. Green 14

The switch to open cut operation is proving the solution to more and more high cost mining ventures confronted with low percentage orebodies. Kennecott Copper Corp. decided to try it at their Ray, Ariz., mine. Results have been gratifying to the company and to a copper-hungry nation.

Mobile Plant and Crew Make Gravel Pay 20

In South Dakota where space is plentiful, move-up time counts on each job. Contractor Myrl Clark, Tyndall, S. D., planned his plant, equipment and crew for greater mobility. His own family and employees' families travel with the job in trailer homes.

Dozer Saw Clears Boysen Reservoir — by R. L. Branam, Bureau of Reclamation, Billings, Mont., Region 6 22

Land clearing contracts for Boysen Dam Reservoir on Wyoming's Bighorn River were advanced more than six months when a tree cutting bulldozer saw was introduced by Mid-States Construction Co. Six other contractors used variations of the idea.

An Analysis of 61 Fatal Construction Accidents During 1950 26

Here is an accident-by-accident account of 1950 fatalities occurring on construction work directed by the Corps of Engineers, U. S. Army. It is presented here to emphasize the variety of unsafe practices that contribute to the national death total. It is further hoped that reading these over will sharpen the watchful eye of the safety supervisor on the job.

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"Some 15,000 employees in all branches of our organization are taking advantage of the Payroll Savings Plan..."

SPENCER LOVE
Chairman of the Board, Burlington Mills

"The Payroll Savings Plan is one of the important personnel services offered to the employees of our company. At the present time some 15,000 employees in all branches of our organization are taking advantage of this splendid plan for systematic savings. In times of national emergency this plan assists in stabilizing the economic life of the employee, the community and the nation."

Last call for the 1951 Defense Bond Campaign!

While the campaign was scheduled for six weeks, beginning Labor Day, the *accounting period* will include all Payroll Savings Plan bond purchases and enrollments in September *and October*.

If *you* haven't conducted a person-to-person canvass to put a Payroll Savings Blank in the hands of every man and woman in *your* company there is still time to join the thousands of companies which have added nearly a million employees to the Payroll Savings Plan through person-to-person canvasses.

Phone, wire or write to Savings Bond Division, U. S. Treasury Department, Suite 700, Washington Building, Washington, D. C. Your State Director will give you all the help you need—application blanks, posters, envelope stuffers, personal assistance.

Give your employees an opportunity to save for their future and at the same time, help to maintain America's economic security—put an application blank in their hands.

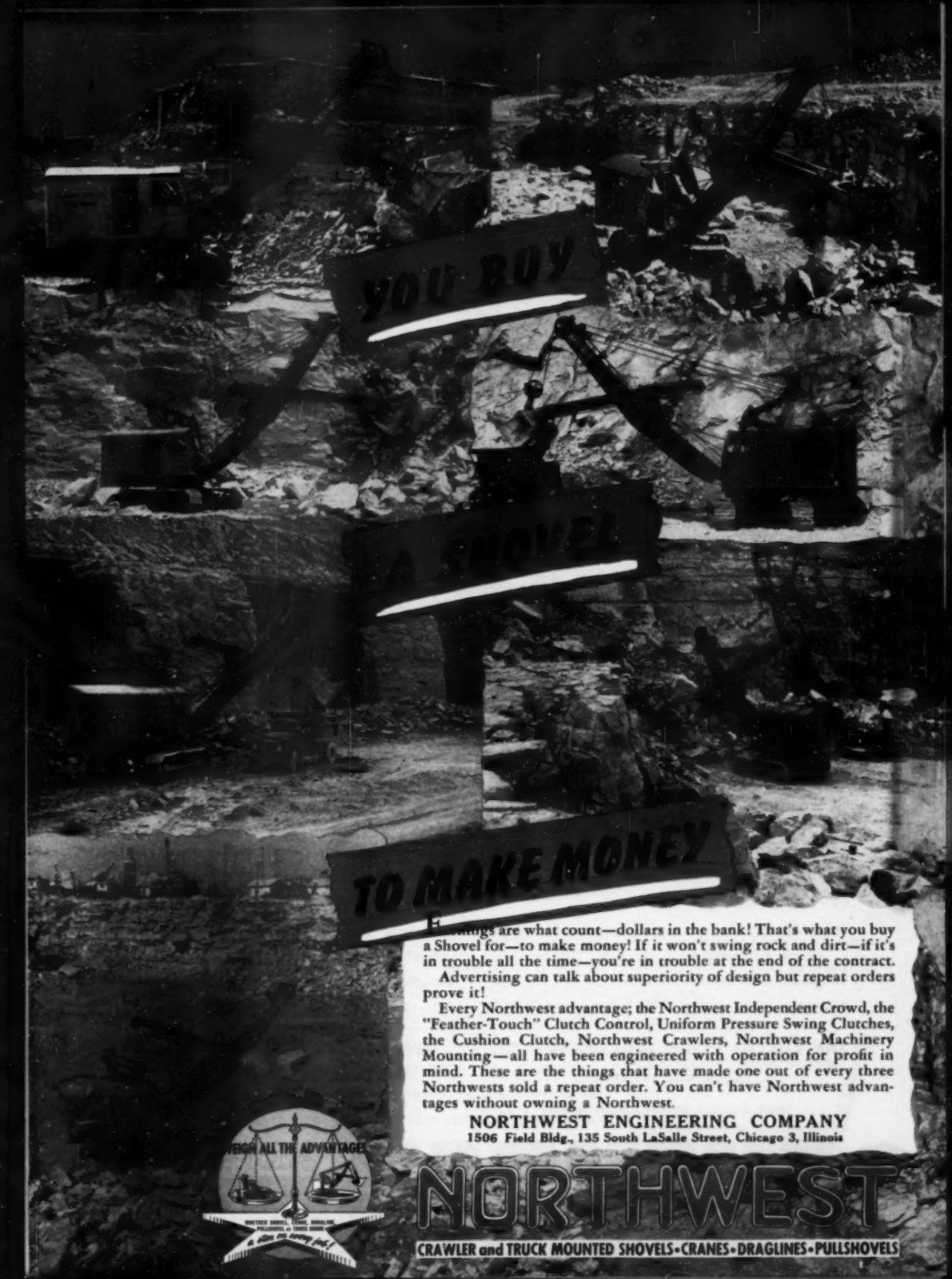
Results of a few recent person-to-person canvasses

Firestone Tire and Rubber Company (40,000 employees), 87% participation; Universal Atlas Cement Company, 67.8% of 4,789 employees . . . Martha Mills, 71% of 2,200 employees . . . Lit Brothers, 52% of 3,600 employees . . . Delta Air Lines, 65% of 2,100 employees; Aerojet Engineering Corporation, 78.1% of 2,000 employees . . . Brown-Lipe Chapin Division of General Motors, 87% of 1,750 employees; Fabricast Division, General Motors, 85% of 1,700 employees.

Person-to-person canvasses now under way include:

	Number of Employees
28 Major Railroads	993,142
Radio Corporation of America	40,000
Owens-Illinois Glass Company	25,000
Cudahy Packing Company	17,000
Pacific Gas and Electric	17,000
Willys-Overland	6,750
Owens-Corning Fiberglas Corp.	6,500
White Motor Company	6,500
Fruehauf Trailer Company	5,700

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and
Excavating Engineer



...ings are what count—dollars in the bank! That's what you buy a Shovel for—to make money! If it won't swing rock and dirt—if it's in trouble all the time—you're in trouble at the end of the contract.

Advertising can talk about superiority of design but repeat orders prove it!

Every Northwest advantage; the Northwest Independent Crowd, the "Feather-Touch" Clutch Control, Uniform Pressure Swing Clutches, the Cushion Clutch, Northwest Crawlers, Northwest Machinery Mounting—all have been engineered with operation for profit in mind. These are the things that have made one out of every three Northwests sold a repeat order. You can't have Northwest advantages without owning a Northwest.

NORTHWEST ENGINEERING COMPANY
1506 Field Bldg., 135 South LaSalle Street, Chicago 3, Illinois

WEIGH ALL THE ADVANTAGES

NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Euclid Scrapers

Make the dirt fly!

Owners in every part of the country report outstanding performance and production with the new Euclid Scraper. It has proved its efficiency and dependability on a wide range of work—construction of roads, airports, levees and in open pit mining.

These features assure top scraper performance ... struck capacity 15.5 cu. yds., 20 cu. yds. heaped ... 10 speed transmission ... 275 h.p. engine ... top speed with full payload 28.2 m.p.h. ... high lift apron and positive roll-out ejector dump loads fast and clean ... four wheel Euclid tractor provides easy, positive steering and has ample power, traction and flotation for fast loading and travel on steep grades and soft fills.

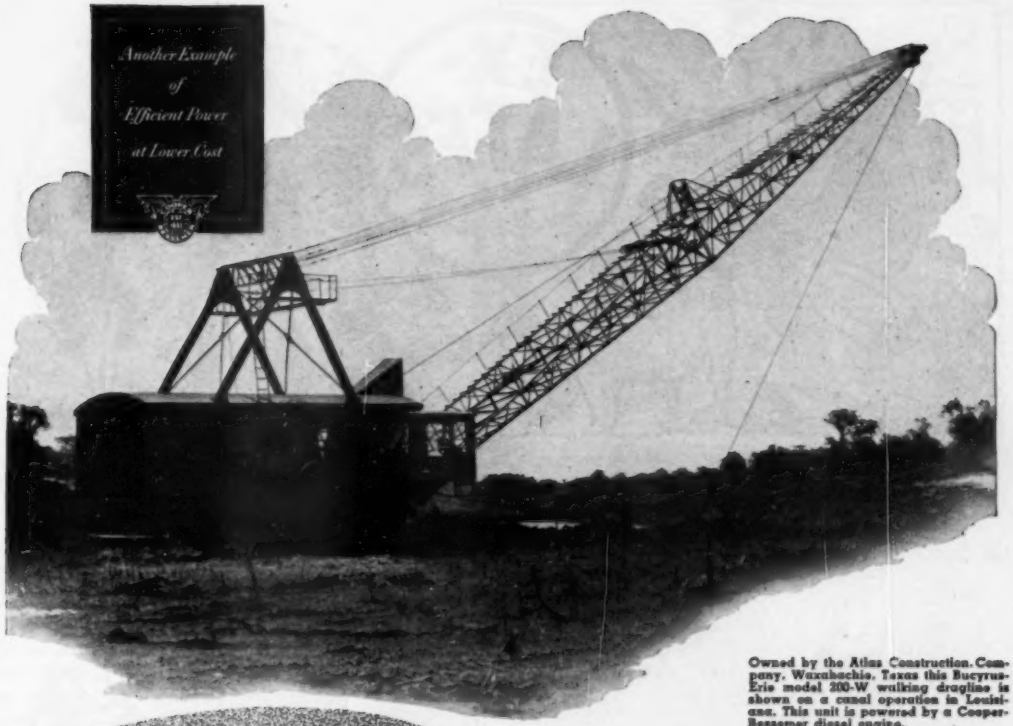
Call your Euclid Distributor or write direct for information on this Euclid Scraper ... the easiest handling and most efficient loading, hauling and spreading scraper for your work.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

CABLE ADDRESS: YUKLID — CODE: BENTLEY

MORE LOADS PER HOUR—
MORE PROFIT PER LOAD

EUCLIDS *Move the Earth*



Owned by the Atlas Construction Company, Waxahachie, Texas this Bucyrus-Erie model 200-W walking dragline is shown on a canal operation in Louisiana. This unit is powered by a Cooper-Bessemer diesel engine.

LONG-RANGE STAMINA

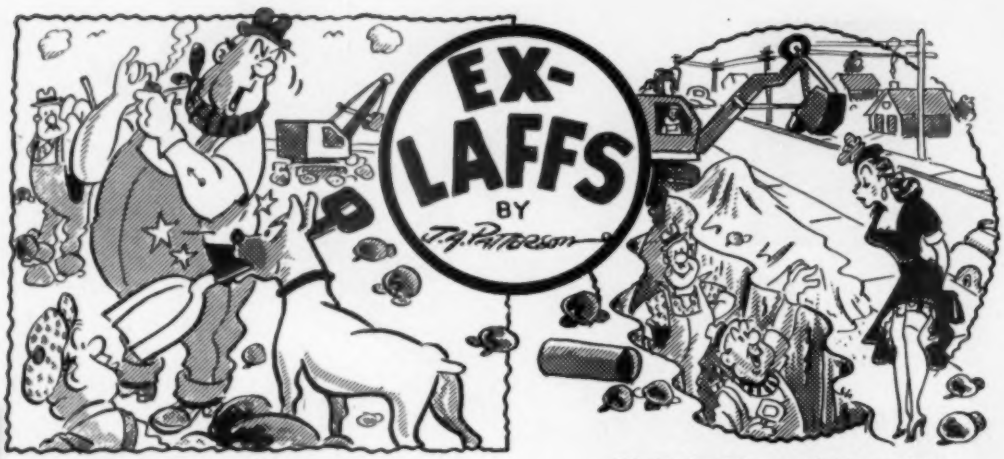
ANOTHER Cooper-Bessemer BONUS VALUE

Wherever you go, wherever heavy duty diesels are at work, you'll find Cooper-Bessemers have earned a reputation for exceptional stamina. Or, call it endurance! It means continuous operation, year-in, year-out, with a very minimum of down time and maintenance.

That's the kind of diesel performance that means extra profit in your pocket. It pays off in draglines, in marine, locomotive and stationary power service . . . *wherever* heavy duty power is used. Why not get *all* the facts on the Cooper-Bessemer features that can cut costs in your particular service? The nearest Cooper-Bessemer office will be glad to cooperate in every way.

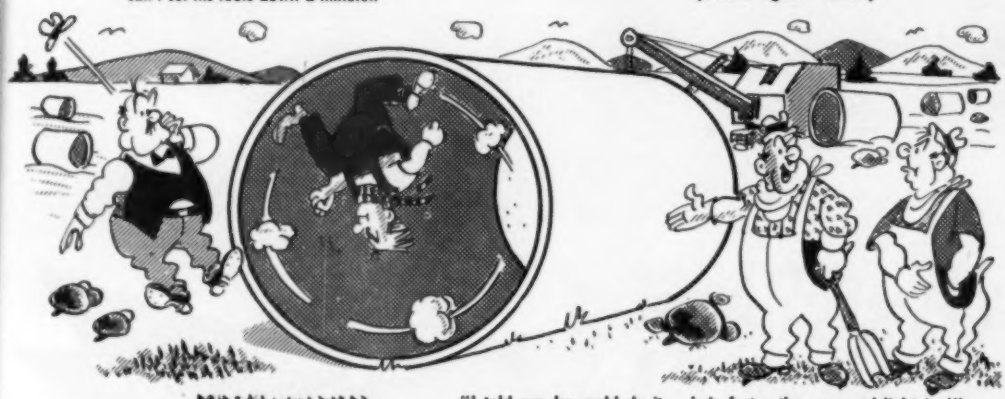
The Cooper-Bessemer Corporation
MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington, D. C. Bradford, Pa. San Francisco Houston, Dallas, Greggton, Pampa and Odessa, Texas Seattle Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela Cooper-Bessemer of Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. Colmes Engineering Co., New Orleans, La.

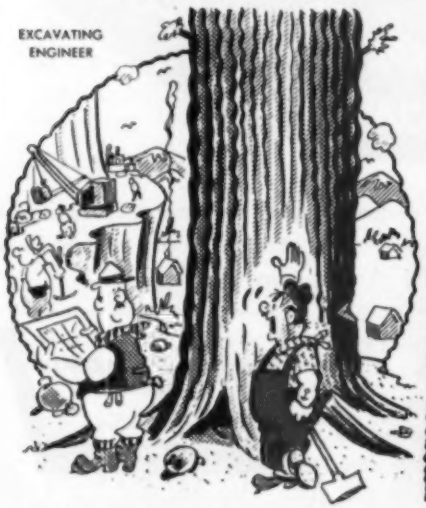


"Th' Boss's got that blasted dog trained so a guy can't set his tools down a minute!!"

"My hearing ain't so good, Miss — ask that question again — slowly."



"I told you he could do it — he's faster than greased lightning!"



"Look, Boss, ain't there some way we can go around this damn, beautiful, majestic thing??"

"Yeah! I can't wait to get into town tonight myself — there's a symphony concert at the auditorium!"

HELP YOURSELF TO STAYING POWER!

A "Caterpillar" Diesel D13000 Engine powers the 1½-cu.-yd. Link-Belt Speeder shovel, loading iron ore into a "Cat" No. 60 Scraper pulled by a "Cat" D8 Tractor. The unit is owned by The Hodge Mining Company and is being operated in their open pit near Canton, Ga. Owner John W. Hodge says: "They're light on repairs, easy to handle and easy on fuel and oil."

THE PRESSURE'S ON! Our country is under way in a tremendous defense effort—and everyone has a job to do. Yours is important. Military and civilian needs call for an estimated $2.8 billion production from the mining industry this year. *And as much or more, next year!*

It's going to be a long pull for men and *machines*. Will *your* equipment stand up? *Much of it must!* Military and Defense Rated Orders must be filled first, so obtaining new machines may take longer than you had planned. But you can easily help yourself to many extra hours of equipment life!

How? If you have "Caterpillar" Diesel Engines, Tractors, Motor Graders or Earthmoving Equipment, you're in a good spot. These units are rugged—and you've got a live-wire partner in your "Caterpillar" dealer. Anticipate your replacement parts needs *before* parts are worn beyond repair. Talk these needs over with him. He is qualified to give competent opinion. If he can't replace, he may be able to rebuild the original part. He has a top-notch service staff and facilities. He'll do his utmost to keep your equipment on the job!

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

You're the Doctor

Due to overheating, freezing, scale deposits, filling a hot engine with cold water, pulling heads down too tight, or other poor maintenance practices—cylinder heads may crack. Your "Caterpillar" dealer is able to repair most cracked cylinder heads. In addition, he can replace worn valve seats with valve inserts and restore the rocker arm mechanism to serviceable limits. Consult your Operator's Instruction Book for proper cooling system and valve maintenance.

REREAD YOUR OPERATOR'S INSTRUCTION BOOK

Good care can add many extra hours of equipment life.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

Here's how rubber-tired TOURNADOZER speeds pit maintenance

STRIPS SHALE THE YEAR 'ROUND

At Middle Branch, Ohio, Diamond Portland Cement Co., strips shale year 'round with C Tournadozer. "Will move as much shale in ½ day as our crawler can in a full day," says Vice President E. K. Evans. For clean-up at plant, Tournadozer runs 3 miles from plant to pit over asphalt roads in a few minutes.

You get action-fast

Tournadozer works anywhere . . . any time, "runs" on big 21.00 x 25 low-pressure tires at speeds up to 19 m.p.h. Tournadozer works in toughest footings . . . up steep grades . . . in any kind of weather . . . through mud, sand, or snow which would stall ordinary crawlers. At a moment's notice, operator can drive rig anywhere over highway or cross country to distant pushing, pulling or dozing assignments. No delays for trailer, blocking, loading or unloading.

With a standard bulldozer blade or interchangeable Angledozer blade or V-type Snow Plow, plus its ability to tow a Rooter or haul Scrapers, Tournadozer is an all-year tool. It has fast, 4-wheel drive on rubber, instant gear change with constant-mesh transmission, torque converter, powerful 4-wheel, disc-type air brakes with a total of 2822 sq. in. braking area, plus fast, easy fingertip electric control.

Check actual job performance reports shown here. Ask your LeTourneau Distributor for additional output figures and other facts on versatile Tournadozer.

Tournadozer, Tourinputl, Carryall, Angledozer, Rooter—Trademarks Reg. U. S. Pat. Off. C149-B

LETOURNEAU LET EQUIPMENT

HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

GRADES AND MAINTAINS ROADS

At pit north of Arctic Circle at Kirkenes, Norway, over 25 million yds. of rock are being removed to uncover magnetite ore. Sydvaranger, A/S, Oslo, started hauling with six 40-ton, rear-dump Tournarockers, later added 6 more plus 2 C Tournadozers. Dozers build and maintain haul roads and handle shovel clean-up. Combined, the 14 units are moving 12,000 tons of rock and ore per day.

SHOVEL CLEAN-UP

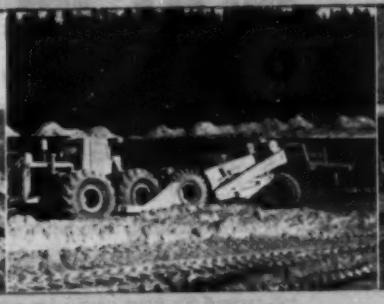
Working at Stanley Mining Company's ore pit at Biwabik, Minn., Tournadozer's principal job is handling clean-up around the ore shovel. On this multi-handling, 24-hr., 7-day a week ore operation, Tournadozer utilizes normal waiting periods to maintain rock dump, clean spillage at crushing plant . . . feed material from surge pile to hopper . . . clear timber ahead of rock drill, etc. Rig has 4 speeds forward, 2 reverse.

DOZES ORE INTO GRIZZLY

On bauxite stripping near Little Rock, Arkansas, 1 Tournadozer handles 5 major jobs every day . . . is on call 24 hours a day. It dozes bauxite ore into 4 to 8 grizzlies . . . maintains quarry rock stockpile . . . cleans up around two 2½-yd. shovels . . . pulls 13-yd. wagon to haul and spread waste material. "It's been doing the work of 2 crawlers," reports the Plant Supt. Operator can change gears without stopping.

MAINTAINS DUMPS

Tournadozer's high-speed and rubber-tired mobility enables it to keep busy day and night for the E. W. Coons Co. at the Genoa strip mine at Eveleth, Minn. During one typical 10-hour night shift, the big rig maintained 2 overburden dumps and lean ore stockpile, did clean-up work around 3 stripping shovels, found time to do haul road maintenance besides. No wonder this firm likes their Super C Tournadozer!



PUSH LOADS SCRAPERS

J. Neils Lumber Co., Libby, Montana, teamed this C Tournadozer with 3 C Tournapulls on an 800,000-yd. access road near Rexford. With Tournapulls on 2000' cycles, Tournadozer pushed 42 loads of sand an hour . . . with 'Pulls on 600' cycles, 54 loads hourly. Load distance for 9½ pay yards averaged 75' . . . load time, 30 seconds. With Angledozer blade mounted, rig speeds sidehill work.

PULLS HEAVY EQUIPMENT

Skidding heavy compressor is one of many maintenance jobs Tournadozer handled around Interstate Iron Co. mines near Calumet, Minn. The "C's" big, 186 h.p. diesel engine and 4-wheel drive develop plenty of drawbar pull to handle heavy loads. It pulls Carryall-Scrapers, tows floaters, heavy-duty trailers, bogged-down trucks; skids generator plants, cable hoists, poles, piling, etc.

SPOTS RAILROAD CARS

Here, versatile Tournadozer spots empty rail cars under ore loader for Meehbi Iron Range Mining Company. Powerful rig is handy for switching cars . . . keeps sidings clear for incoming freight. Tournadozer takes shortest route between jobs . . . rubber tires permit it to cross or follow tracks anywhere without planking. Instant-shift gear selection keeps unit pushing without losing momentum.

WORKS SCATTERED JOBS

Leveling spoil, clearing snow, and handling pit clean-up for West Virginia-Pittsburgh Coal Co. mines at Collier, W. Va., Tournadozer drew high praise from Owner P. A. Howe. "It dozes 50% more spoil than a crawler," he said, "and is so fast and mobile that we use it to work all 5 of our pits over a 10-mile route. It saves us 1 to 2 tractors." Drives a mile in a few minutes . . . travels over pavement, crosses tracks.

PLOWS SNOW

In 24° below zero weather, a Rural Municipality in Manitoba cleared over 600 miles of roads and farm lanes in 142 hours. Drifts were 3 to 8 ft., some almost solid ice. Tournadozer mounted a LeTourneau 12'3" x 6'6" V-type snow plow. Vertical divider plate in center cuts frozen drifts . . . eliminates plowing snow back on road . . . big tires and adjustable runner shoe protect plowed surface.

R. G. LeTOURNEAU, INC., PEORIA, ILLINOIS

For Logging

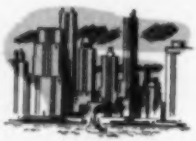
For Sand and Gravel

For Aircraft

For Marine

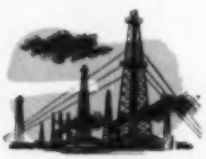
For Stone Quarries

For Construction



For Elevators

For Mining



For Drilling

For Industrial

For better service and more economy

MACWHYTE

PREformed...Internally Lubricated

WIRE ROPE

A thousand and one **to order from assures the right rope for your equipment**

It will pay you to get Macwhyte Wire Rope, engineered and job-proved for your particular equipment. Over the years, ropes for all types of equipment in every field have been developed by Macwhyte. Recommendations are promptly available from Macwhyte distributors or Macwhyte Company. You get the correct wire rope for your equipment when you buy Macwhyte.

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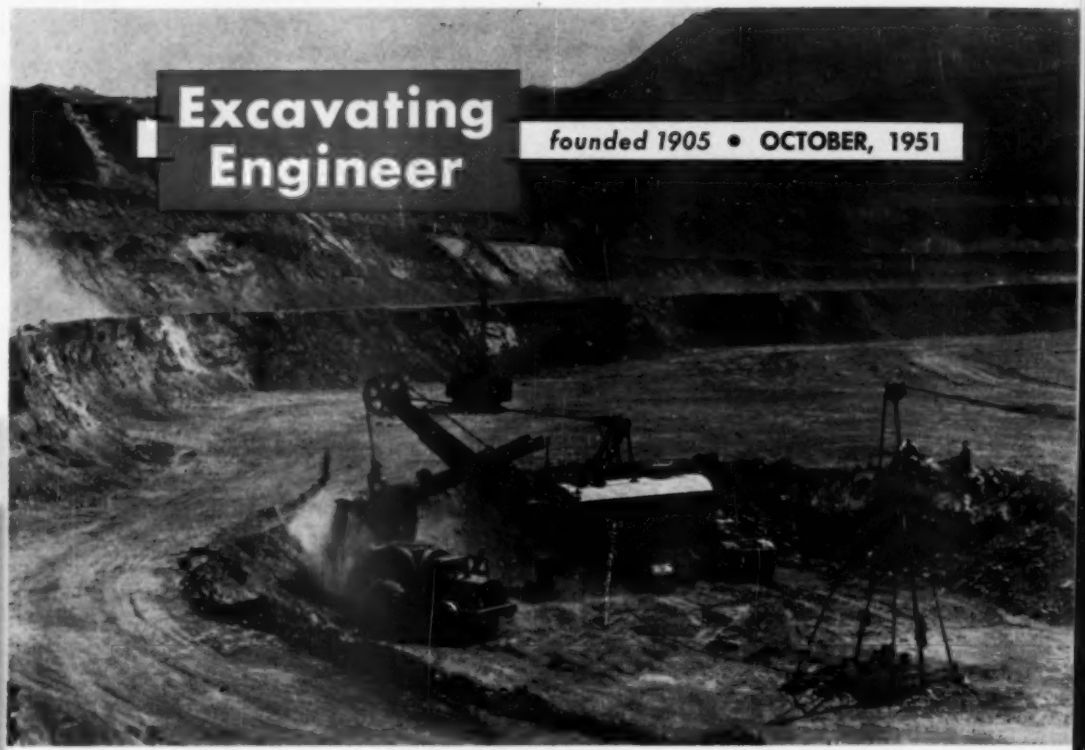


The Copper Mine at Mineral Creek

by Robert J. Green

• Here a Bucyrus-Erie 120-B electric shovel is going down into new ground to form another bench in the pit. Empty powder boxes at the left outline the edge of berm. A DW-10 and U-type dozer at right cleans up around the shovel.

The switch to open cut operation is proving the solution to more and more high cost mining ventures confronted with low percentage orebodies. Kennecott Copper Corp. decided to try it at their Ray, Ariz., mine. Results have been gratifying to the company and to a copper-hungry nation.

THE Kennecott Copper Corporation, following extensive exploratory and check drilling, decided, in the latter part of 1947, to mine the larger part of its Ray, Ariz., ore body by open pit methods. It was recognized that this partial change from underground to surface mining would extend the life of the property, expand production, reduce costs and improve the overall labor situation.

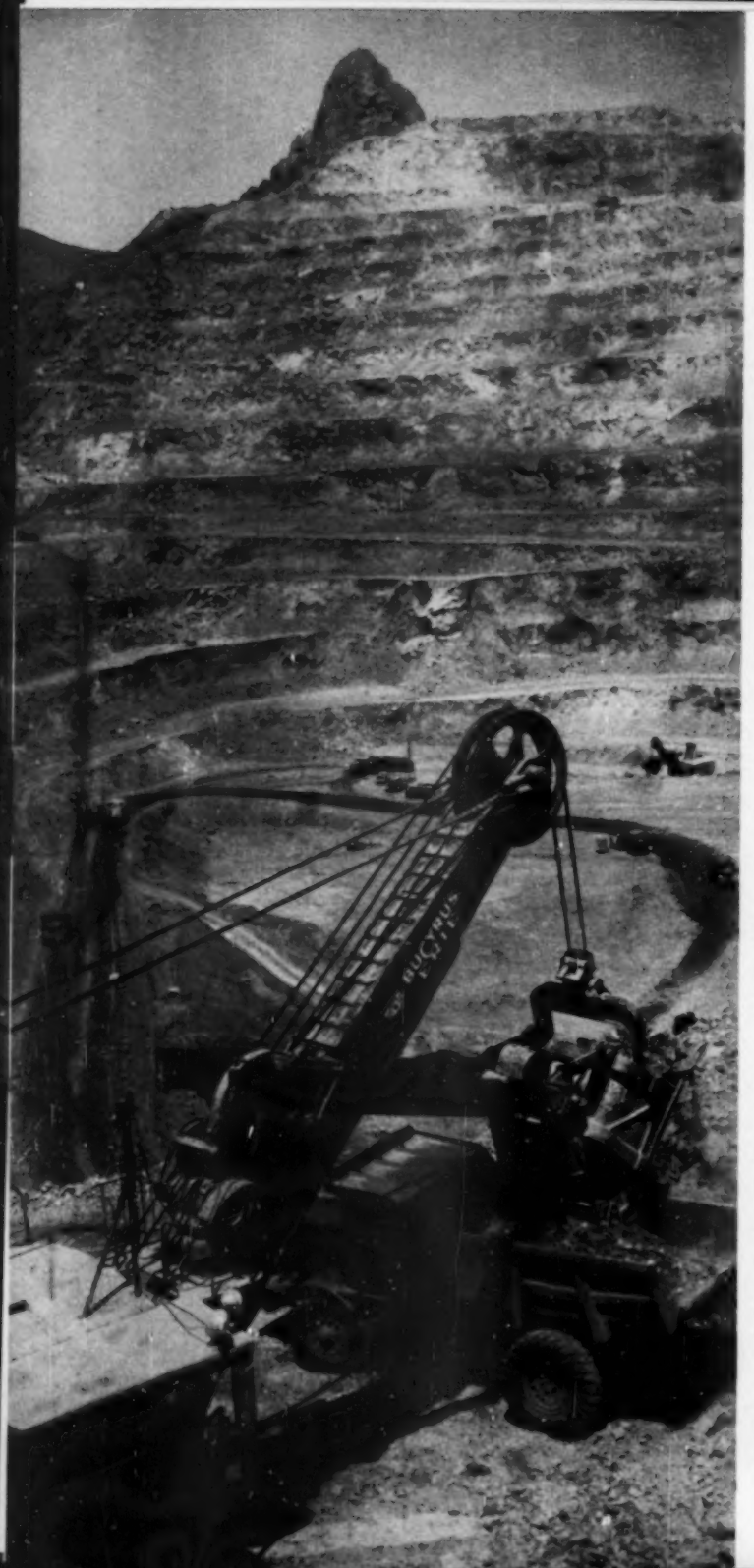
The diversion of Copper Canyon Creek, a necessary preliminary to the development of the pit, was undertaken at once, and plans were laid for a full scale stripping program as soon as conditions permitted and equipment became available.

Contract negotiations started almost immediately thereafter with the Reno, Nev., contracting firm of Isbell Construction Co. A figure was set whereby the Isbell firm would receive a certain amount per ton of material excavated as the open-cut mine took shape. By January, 1948, Isbell's crews and equipment had started the first work on a stream diversion. By August, 1949, production of the first ore had begun. By June of 1951, the contractor had moved approximately 35 million tons of material. Some three million tons of ore had been recovered from that total tonnage, and the ore ratio was beginning to rise.

When the open cut is well established, Kennecott Copper Corp. will take over with its own crews and equipment and finish out the mining operation. But in the meantime, Isbell's equipment is moving about 1¼ million tons of material per month.

The general mining area in the Ray region has produced copper since about

● Looking across the pit. Bucyrus-Erie 29-T blast-hole drill in the foreground is drilling to deepen the pit floor. In background, a 54-B loads material. Four churn drills and a 120-B are working at the top, as benches take shape.



1880, when the first mining attempts were made. Present Kennecott operations continue a long history of man's attempt to recover valuable minerals from the mountainous, sparsely settled area.

The Copper Orebody

Copper-bearing ore is found in a rectangular area measuring 2,600 feet East-West by 2,000 feet North-South. The highest point of ore, along the south boundary, is 2,450 feet above sea level. Along the east edge the ore is found no higher than 2,100 feet. The present pit floor is at 1,900 feet, and eventually the open-cut operation will carry the pit floor down to elevation 1,700. The average elevation of the town of Ray is 2,040 feet above sea level.

Schist is the principal rock formation, with intrusions of diabase. Iron occurs in the form of pyrite. Chalcocite is found in the schist, in stringer-type deposits, left by nature as the original pyrite was replaced. It is found in disseminated veinlets inter-crystallized with pyrite in all degrees of enrichment. The broken ore oxidizes readily, and ultimately takes the form of oxides or iron and copper sulphates.

Mineral Creek Diverted

Mineral Creek, a normally small stream subject to flooding when cloudbursts hit its watershed, ran through the center of the proposed open-pit cut. Before stripping could begin, this stream had to be diverted around the site. One 90-ft. rock ridge and several of lesser height stood in the way, and 900,000 tons of rock excavation had to be handled in advance of mine stripping.

The formation was broken up by drilling powder holes with wagon drills, jackhammers, churn drills and compressors from the pool of Isbell's equipment which will be detailed later. Forty per cent Apache powder was used at the rate of ½ pound per ton of rock. The broken material was then removed from the channel change by a fleet of five Caterpillar D8's with Model W LeTourneau scrapers. A Northwest 2½-yd. shovel and four Euclid end-dump trucks also handled some of the material.

To match the magnitude of the excavation job, Isbell's organization un-

• Beyond this loading scene of one of the higher-perched 120-B's, we see equipment strung out over the pit floor and benches taking shape in the far background.

der the personal supervision of its president, C. V. Isbell, moved in with a large pool of heavy-duty drilling, loading, hauling, and auxiliary road-maintenance equipment, setting up a headquarters shop and office in the town of Ray near the site.

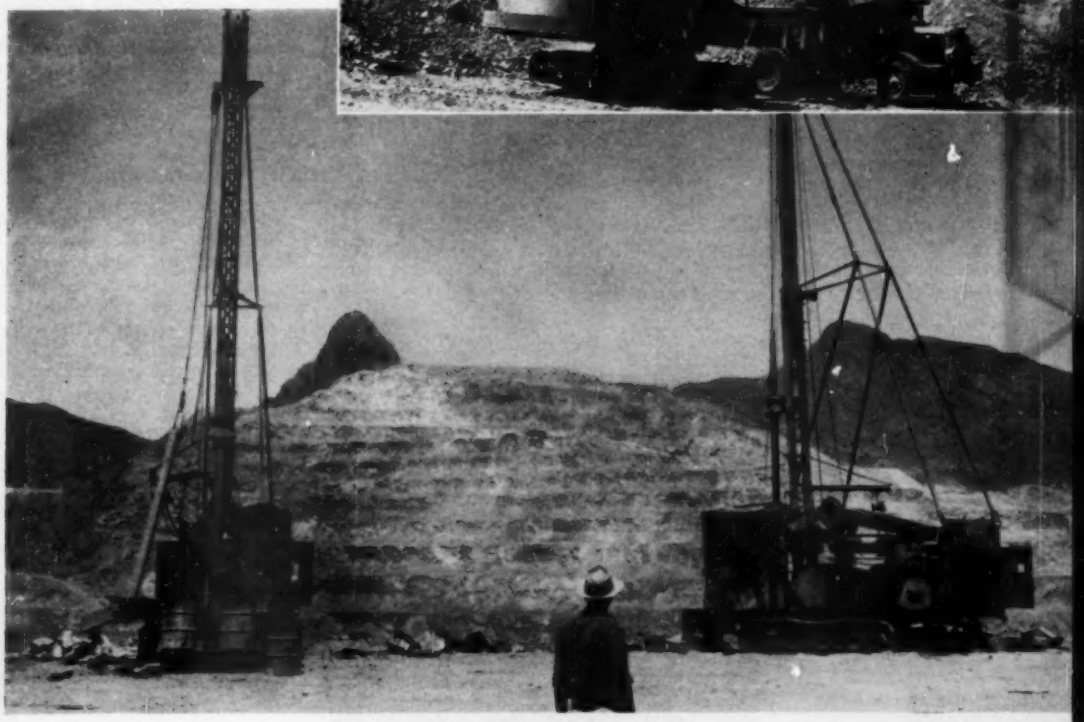
Move in Equipment

Drilling equipment consists of three Bucyrus-Erie 29-T and three 27-T churn drills, internal-combustion-engine powered, with both model machines carrying 8½-in. diameter drill bits. There is also an Ingersoll-Rand wagon drill for a few of the places inaccessible to churn drills, and this machine also worked on the Mineral Creek diversion. Several jackhammers are also included in the drill equipment pool.

Loading equipment consists of three Bucyrus-Erie 120-B shovels with outsize 6-yd. Esco dippers, a Northwest 80-D and a Bucyrus-Erie 54-B, both with 2½-yd. Esco dippers. Hauling rigs are all Euclids: four bottom-dump 18 LDT's, six 1-FFD's, one 4-FFD; and 13 TD's divided about equally be-

• Mine officials at Ray include Chief Engineer R. W. Thomas, left, who designed the water storage dam, and Manager A. P. Morris. Daily consultations are necessary to get the benches formed properly and to take care of all other engineering details. Below: A Bucyrus-Erie 54-B loads ore against the sloping berms which will later be permanent benches.

• Two 27-T churn drills work high up on the south face of the pit.



• Permanent benches are rapidly taking shape here as we look across to the northeast side of the pit. The town in the background is Ray, Ariz., and the rugged mountains in the back are typical of the terrain.

tween 20's and 37's. Yardage capacities range from 18 to 25 cubic yards. Some of the hauling units are experimental improved models with torque converters and twin high-horsepower engines.

Auxiliary equipment for the big mechanical excavating job includes a U-type dozer on a DW-10 for stacking material, three D8's with dozers, and two 2,500-gal. water tank trucks on Ford F8's. The latter machines are used to keep dust down on haul roads. The water they sprinkle is waste from a leaching plant.

The stripping operation is designed to remove ore-free overburden and at the same time to shape up a uniform system of 40-ft. benches or terraces, each with a 1:1 front slope. At the present time, bench heights vary from 30 to 50 feet, but the variance is being rapidly ironed out. All the stripping is in rock of some type.

All drilling, with the possible exception of a few inaccessible places, is being done with Bucyrus-Erie churn drills, and the holes, on 20-ft. centers, are being carried down five feet below bench grade. In order to carry 8½-in. uniform bits on the 27-T drills, Isbell's mechanics added an extra rubber disk to the shock absorber on each machine, and cut a larger hole in the drill table to accommodate the larger tools. The tool string on the 27-T's weighs about 2,000 pounds, while a 3,000-lb. string of tools is used on the 29-T's. The difference in weight is in the drill stem.

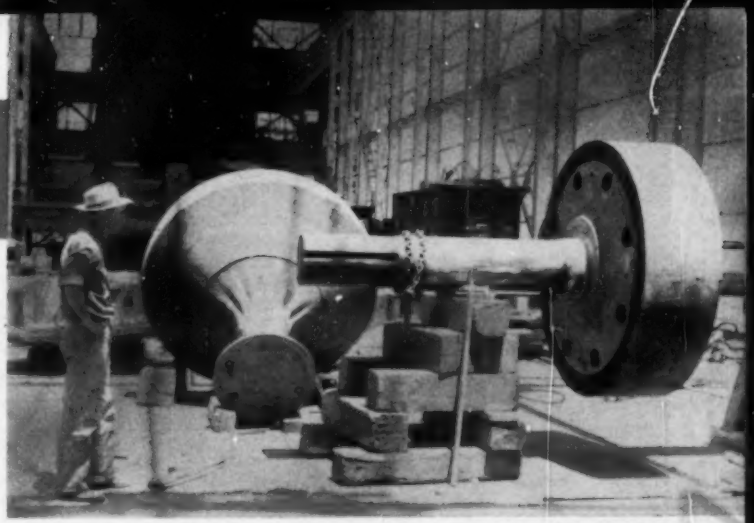
Drillers on both models of machines aim for 100 feet of hole per 8-hour shift, and they often get that much. But sometimes the formation is hard or seamy, and footage will drop. On the shallower benches where a machine has to be moved oftener to drill 100 feet, footage also drops. Drill bits show widely varying wear in the variable formation. Almost always a bit will last for 30 feet of drilling, but it is not too infrequent to have a bit last for 160 feet of drilling. The drill bits are sharpened and shaped at the shop, where a Bucyrus-Erie sharpener is located. Ordinary water tempering is the rule.

Springing of holes with normal bench heights is a definite exception. Springing is never attempted unless there is excess water in the hole which powder men want to clean out. The general rule for loading is a 60% priming stick of gelatin, followed by Apache 40% bag powder which is poured in and tamped. As a rule, three sets of delays are used to break the material in the desired direction. Sometimes only three to six holes are shot at once, and sometimes as many as 20 holes are fired at one blast. In any case, the blasts are controlled by the use of Atlas Rockmaster delay caps.

Broken rock and ore are loaded out by the power shovels. Good ore is separated from the waste material at the point where pay meets non-pay material. All waste overburden is hauled to a dump area about 2,500 feet from the center of the pit. When the stripping started, this dump-ground was a deep ravine. So much waste material has now been dumped into this site that Isbell has formed a

• Left: One of the bigger Euclid hauling units dumps a load of waste material off the side of the fill. The waste area is so big that Isbell made a 2,000-ft. landing strip for its planes.

• Right: Here is the secondary crushing plant, with a conveyor in the far background loading off the primary crusher.



• Some of the gyratory and roll crusher equipment for the secondary unit which was installed in the plant is shown here.

smooth 2,000-ft. plane runway. The "airport" is regularly used by Isbell's planes, and some emergency business with Phoenix firms is also done by plane. It is much easier to fly in and land at the job than to drive a car over the 17-mile rough gravel road between Ray and Superior.

The only other principal excavation problem is the constant interception of block cavings, drifts, and raises which date back into the late '80's and early 1900's. Many of the subterranean excavations extend down to the 1,850-ft. level. They are complicating present-day excavation and they are certain to complicate future mining when the standard 40-ft. benches with 1:1 slopes are established.

For many months the entire excavation output was waste, but finally, by August, 1949, the first ore had been uncovered. The ratio of ore to waste will naturally increase as the pit is opened up wider and deeper. At the present time the trucks which are loaded with ore take their loads up to the reduction plant, where crushing equipment makes the first step in the ultimate reduction of ore to size. Details of the ore-recovery process are part of the company's stock-in-trade, but from an excavation standpoint it can be said that the raw ore is crushed to ¾-inch minus size at the pit site, and then hauled by rail 23 miles to the Hayden concentrator, where final pulverizing and ore recovery is done.

At the present time Isbell's equipment is moving about 1¼ million tons of material a month. The daily ore tonnage figure is now 12,000. Three thousand tons of this daily output still comes from underground mining. Future operations, company officials believe, will soon step up the daily ore production figures to 12,000 tons from the open-pit cut, which will make a daily total of 15,000 tons.

The first mining camps at Ray and Sonora have grown into modern cities, where about 3,500 people now live and work. They are a far cry from the early days, and even the isolation of the

Continued on page 48

Mobile Plant and Crew Make Gravel Pay

• Top: International TD-18A crawlers load intake trap near Sturgis, S. D. Trailers in distance house families of contractor and employees. Bottom: Man on conveyor knocks off large rocks into truck. Cedar Rapids Master tandem crusher loads International LF-190 trucks.

NEW, big equipment and speed between jobs are two basic rules for success in the gravel contracting business according to Myrl Clark of Tyndall, S. D. Clark has plenty of both to prove his point. Nearly all his tractors and trucks are new models and his crew lives in de luxe trailers which speed to every job along with the equipment.

Not only is Clark the largest gravel contractor in South Dakota, but, in his 10 years as an independent operator, he has never needed more than half the time allowed on any contract. He did $400,000 worth of business last year with a payroll of $90,000. Between April 3 and June 8 this year he laid 138,000 tons of gravel.

Typical of his high-speed operation is the job pictured here, which he completed in 350 working hours. It was a 10½-mile base course on South Dakota route 24, beginning 2½ miles east of Sturgis. The contract was for $76,000 and involved the production and laying of 74,000 tons of gravel and topping with 91,00 gallons of MC Texaco road oil.

The gravel for this job was purchased from a nearby ranch at five cents a yard. Three bulldozer-equipped crawlers worked the pit alternately, dozing large loads into a trap over the conveyor to a Cedar Rapids Master tandem crushing plant. The pit was fan-shaped with a 300-ft. radius. Crawlers loaded into the trap with dozing cycles from 100 to 200 feet. Usually two crawlers loaded simultaneously, while the third back-graded for another run. The load from one was used as a guide for the load being dumped. Two men removed all rock over two inches in size as the material entered the crusher. Coming from the crusher, the material was loaded by conveyor into dump trucks for laying on the road. Trucks entered and left the loading area over one-way roads.

Dumped gravel was worked into windrows by three Adams motor graders and moistened with water. For final working the graders and three double gang rollers drawn by three International MD wheel tractors graded and compacted in a single, staggered line. This gave about 250 pounds psi compaction, according to Mr. Clark. Surface was then swept clean with a Roscoe 8-ft. broom powered by a Wisconsin V-4 engine and drawn by a pickup truck.

In South Dakota where space is plentiful, move-up time counts on each job. Contractor Myrl Clark, Tyndall, S. D., planned his plant, equipment and crew for greater mobility. His own family and employees' families travel with the job in trailer homes.

MC1 Texaco road oil was pumped from railroad tank cars at Sturgis into two insulated tankers pulled by truck tractors. The oil was then laid down as a prime coat and rolled.

Earlier this year, Clark completed a contract covering placement of 135,000 yards of base course and prime oil coat in 36 working days. This contract for a 15-mile stretch of South Dakota highway 41 south of Plankinton allowed 120 days for the work.

Clark says his success is based on a few simple factors: (1) big equipment in top condition, (2) experienced labor with five key men employed the year round, (3) fast travel time between jobs.

As a rule of thumb, Clark says he likes to replace his trucks every year and his tractors and heavy equipment every two years. At present, 20 of his 23 International LF-190 dumps are 1951 models. The others are 1950 models. Three of his four International crawlers are new this season.

With his preponderance of new equipment, Clark reports little down time in the field. During the winter he rents shops in a town and overhauls the equipment he retains. Last year he wintered in Rapid City, S. D. This winter he expects to tune up at Yankton, S. D.

Everything Clark owns is mounted on rubber for moving fast between jobs. His crawlers roll from job to job on two LaCrosse Low-Boy trailers. Diesel power plant that furnishes light for his trailer village is mounted on wheels. This emphasis on mobility, according to Clark, makes it possible to finish one job in the morning and move all his equipment and his crew's living trailers to a new job 30 miles away and lay gravel there the same day.

Clark's crew numbers about 35. Twelve of the married men live in their

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• Compacting new gravel on route 24 near Sturgis, S. D., are five Bros 13-wheel rollers pulled by International MD tractors which give about 250 pounds psi compaction.

o Above: Dozer with saw-tooth blade attached. The machine shown is owned by Asbell Bros., Riverton, Wyo.
Below: Timber in Boysen Reservoir area is no obstacle to giant saw attached to bulldozer. One machine can clear five acres of dense timber in eight hours and, in areas of less cover, 10 acres in eight hours. Machine shown is owned by Watkins and Pennington, Fort Collins, Colo.

Dozer Saw Clears Boysen Reservoir

By R. L. Branam, Bureau of Reclamation, Billings, Mont., Region 6

Land clearing contracts for Boysen Dam Reservoir on Wyoming's Bighorn River were advanced more than six months when a tree cutting bulldozer saw was introduced by Mid-States Construction Co. Six other contractors used variations of the idea.

A TOTAL of 12,722 acres of tree covered reservoir land, of which 3,610 acres were classified as heavy timber, had to be cleared at Boysen Dam, now under construction on the Bighorn River about 20 miles south of Thermopolis, Wyo.

It was a job of major proportion, but when a swordfish-like blade was attached to the front of a bulldozer, the proportion dwindled considerably. Trees up to 24 inches in diameter fell with a single swipe of the 6-foot-long V-shaped saw blade.

The cutting job is an innovation introduced into reservoir clearing operations in this area by the Mid-States Construction Co., Chisholm, Minn., and which has been adopted by six other contractors engaged in reservoir clearing operations for the Bureau of Reclamation in Wyoming.

With the use of the tractor-mounted saw, which has teeth on each side, a single dozer can fell as many trees as could be cut by five chain saws and crews.

The operation is extremely simple. The dozer operator guides the saw so that the point of the cutting edge strikes the base of the tree and then forces the saw through the trunk, cutting, with a single pass, cottonwood trees with a diameter up to 24 inches. A single machine can fell up to five acres of dense timber in eight hours. In areas with less cover, 10 acres can be cut in an 8-hour shift.

In Boysen Reservoir, the contractors also have adapted a rake arrangement to the dozer blade. The heavy tines extend below the blade about eight inches and gather brush and other growth as the dozer blade collects the cut trees and uproots the smaller trees not felled with the saw blade.

The saw blade, with which it is possible to cut the trees at ground level, has several variations at Boysen, with the six contractors engaged in clearing Boysen Reservoir using slightly different blades and teeth arrangements. Some of the blades are finely cut and kept sharp; others work with a tearing action and do not require sharpening.

The six contracting firms presently engaged in clearing operations at Boysen are Asbell Bros., Riverton, Wyo.; Lichty Construction Co. and Brasel & Whitehead, Riverton; A. M. Conrad, Big Piney, Wyo.; Watkins & Pennington, Fort Collins, Colo.; Linquist, Olson & Co., Cambridge, Minn.; and Mid-States Construction Co. C. L. Hubner Co., Denver, recently completed a clearing contract.

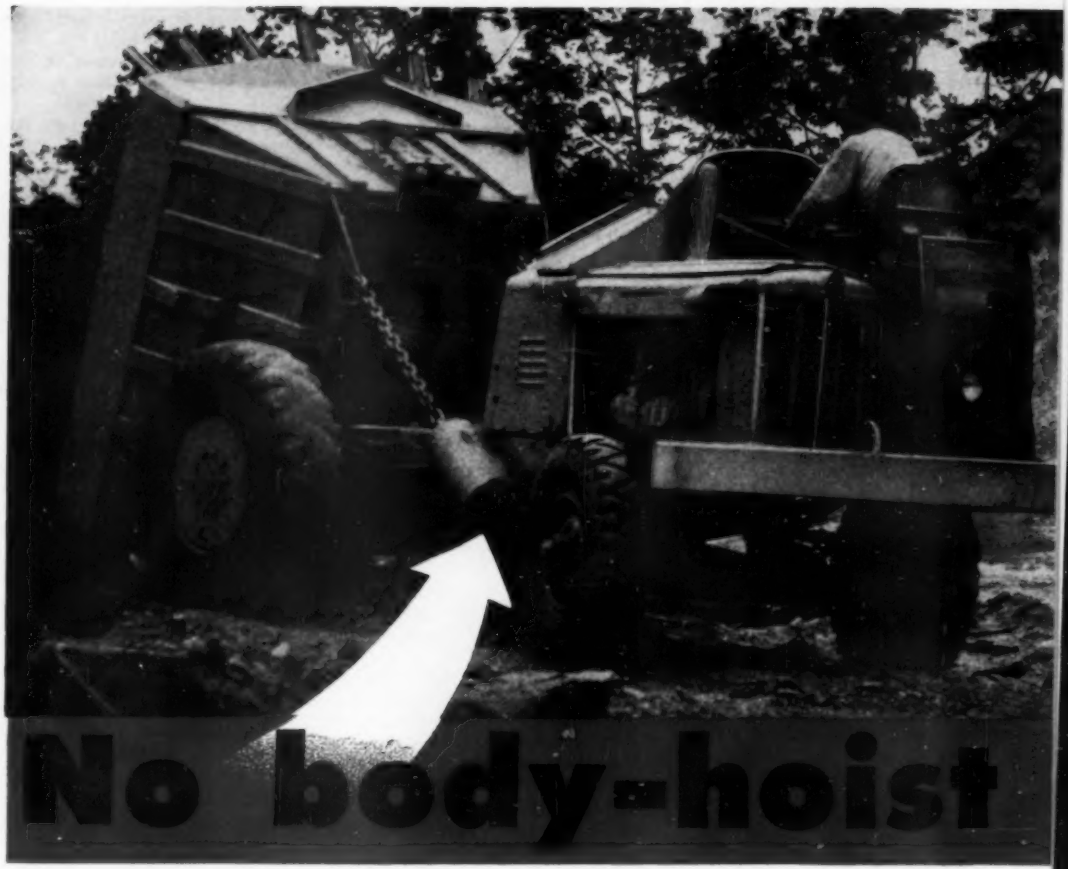
A saw with a single blade has been adapted for use in cutting pine and cottonwood trees in the clearing of the reservoir area for the Keyhole Dam on the Belle Fourche River near Moorcroft, Wyo. The blade in use here by the Lamb Construction Co., Lusk, Wyo., is shorter and more adaptable to the terrain and cover at the reservoir site. Keyhole Reservoir will provide for control of floods and for additional irrigation water for the Belle Fourche project in western South Dakota.

From Boysen Reservoir, 20,000 trees will be salvaged, 4 to 12 inches in diameter, to be used in its erosion-control program on Five Mile Creek which extends west from the upper end of the reservoir area. Because they have no commercial value, the rest of the cottonwoods will be burned with the brush. All heavy cover at the shore of the reservoir and all loose material from the middle of the reservoir area must be removed in order that the flotsam will not interfere with the operation of the dam and power plant or create hazards for the recreational use of the reservoir.

The control and conservation of the flows of the Bighorn River by Boysen

Continued on page 48

• A D-7 dozer with tines attached to bottom of dozer blade piles downed timber for burning. The machine shown is owned by Asbell Brothers, Riverton, Wyo.



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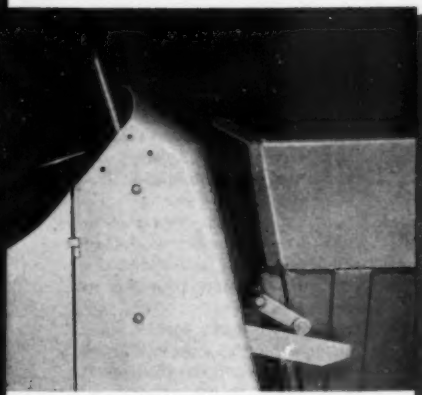
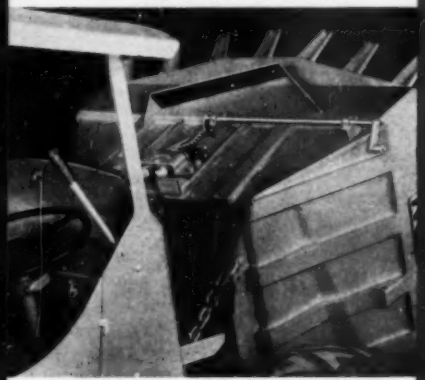


Dumptor body release lever is conveniently located alongside steering wheel . . . there's no reaching or stretching necessary . . . trip lever engages trip rod on body.



Trip rod instantly releases latch hooks from latch seat on chassis frame . . . and gravity dumps the load. Latch automatically locks as body returns to loading position.

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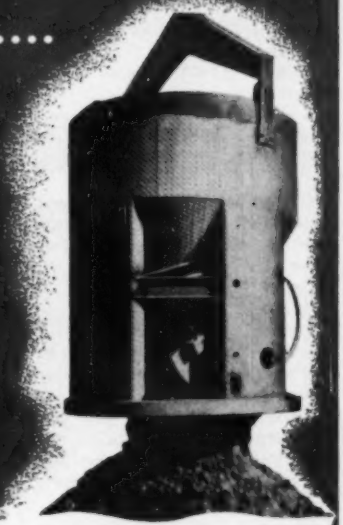

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KOEHRING SUBSIDIARY

An Analysis Of 61 Fatal Construction Accidents During 1950

DURING 1950, 61 civilian employees were killed on work being directed by the Corps of Engineers. Nine were government employees; 52 were contractor employees. The following study establishes why these fatalities occurred and what must be done to ensure safe working conditions.

The first search of the information in the 61 reports established the following distribution:

a. 28 cases (46%) involved mechanical equipment. (Exclusive of motor vehicle.)

b. 9 cases (15%) involving working surfaces.

c. 8 cases (13%) involved motor vehicles.

d. 6 cases (10%) involved floating plant.

e. 5 cases (8%) involved excavations.

f. Of the remaining 5 cases one each was attributed to occupational disease (silicosis), firearms, poison, blasting, and fire.

Mechanical Equipment—48% of all fatalities

1. Material train on construction bridge struck an inspector when he stepped into its path. (No flagman on head of train.)
2. While inspecting miter gate machinery on lock, electrician was crushed in mechanism. (Set into operation by employee at remote location.)
3. Laborer's clothing became entangled in anchor winch while he was operating the winch alone below deck. (Wearing loose clothing.)
4. Crane handling concrete bucket knocked laborer from scaffold. (Swinging to blind side without direction.)
5. Stationary crane brakes failed to hold, dropping concrete bucket on laborer. (Brake air line failed. Also workman standing under load.)
6. Winch truck was used in pulling forms. Forms fouled. Iron worker investigating trouble was crushed when flagman signaled operator to release load line and the form sprung back.
7. Crane operator left his position to help oiler lash bucket to heel of boom and left the motor running. Friction on boom line became engaged, pulling boom back over cab, crushing oiler.
8. Operator instructor on self-loading tractor-scraper fell from his makeshift seat (battery box) while instructing new operator and was run over.
9. While logs were being pushed with a bulldozer, one log overrode the blade and struck the operator.
10. Tractor was pulling over an unanchored skid pile when it rolled and struck a laborer standing near by with his back towards pile.
11. Oiler was working on boom of a whirley while the end of boom was supported on some cribbing. Cribbing collapsed and oiler was thrown to ground.
12. Welder was lying on ground under a sheepsfoot roller making field repairs. The roller was struck by a tractor which caused the roller to move forward, crushing the welder.
13. An inexperienced tractor-scraper operator lost control of the unit. It overturned, crushing the operator. (Descending a 20% grade.)
14. A shovel was traveling a steep grade when the operator lost control. It rolled back over bank, killing operator. (Traveling excessive grade without aid or providing blocking.)
15. Bulldozer operating too close to edge of bank overturned, killing operator. (Night operation with poor light—operating parallel to bank.)
16. Bulldozer tractor backed over dumpman as he stepped behind dozer to direct truck. (Congested work area.)
17. Motor crane operator working on a bridge pulled off outrigger blocks instead of removing blocking. Outriggers struck a large tool box which in turn struck an electrician and knocked him through a deck opening.
18. Oiler was crushed between counterweight and frame of crane while oiling universal joint. (Oiling during operations.)
19. Welder was lowering scaffold down the side of a pier by means of attached air hoist. Scaffold fouled on projection. Welder suddenly reversed the air hoist and then lost control as the scaffold again fouled on a projection while it was ascending. The welder and his partner were both thrown from the scaffold. The welder fell into the river. His partner managed to hold onto some reinforcing steel and was able to climb to safety.
20. Bulldozer tractor rolled over embankment with operator. (Working parallel to bank.)
21. An electrician making adjustments on the controls of a whirley accidentally released the boom, which struck a laborer eating his lunch under boom.
22. A defective winch on a swinging scaffold gave way, dropping the scaffold and laborer. Clutch plate broke—had been broken before.
23. Cableway operator allowed the cableway skip to dip into the river while an ironworker was riding in the skip.
24. Operator lost control of crane while handling swinging pile driver leads with loftman in the leads. (Leads fell, crushing loftman.)
25. Oiler was crushed between counterweight and spoil pile while trying to load a drum of oil onto a

Here is an accident-by-accident account of 1950 fatalities occurring on construction work directed by the Corps of Engineers, U. S. Army. It is presented here to emphasize the variety of unsafe practices that contribute to the national death total. It is further hoped that reading these over will sharpen the watchful eye of the safety supervisor on the job.

shovel while it was in motion.

26. The steering arm of a mine truck broke. Operator became excited and jumped from machine and was run over. (Defective steering arm.)
27. Truck driver was helping to push a load of iron pipe into place when the crane's load line came in contact with a high line. (Operating to close to voltage line.)
28. Laborer holding a concrete bucket as it was being swung into place fatally shocked when the crane's load line came in contact with a high line.

Working surfaces—15% of all fatalities

1. Laborer fell through unguarded opening between floating plant—no life preserver.
2. Foreman fell 140 feet from scaffold. (Caused by loose deck board.)
3. While placing insulation on a hangar roof, ironworker fell on insulation already in place which gave way, dropping him 47 feet to ground. (No walkway provided.)
4. Foreman fell from form work. (Slippery condition.)
5. Scaffold collapsed, dropping carpenter into river. (Scaffold was being used before it had been completed.)
6. Laborer fell down unguarded hoist way.
7. Carpenter fell through floor opening when he stepped on opening cover from which support had been removed.
8. Painter carrying rope onto the pier of a dam fell 40 feet when rope became entangled on projection.
9. An overloaded scaffold collapsed and struck a laborer.

Motor Vehicles—13% of all fatalities

1. Derrick operator struck by a passing auto as he got off bus.
2. A laborer assigned to direct traffic at street intersection was struck by a private auto that skidded after colliding with truck.
3. Driver operating a truck at excessive speed was killed when it overturned on a curve.
4. Two trucks collided at a haul road intersection, fatally injuring one operator. (Using wrong roadway.)
5. Laborer riding on top of load was thrown off when load shifted. (Riding on load and improper lashing of load.)
6. An oiler standing near a shovel was run over by truck that was backing into position. (No signalman for directing trucks.)
7. Truck driver making repairs was crushed when another truck backed into him.
8. Electrician was run over by truck backing down grade and out of control because of brake failure.

Floating Plant—10% of all fatalities

1. Attempting to rescue others, a lockman was drowned when boat swamped.
2. Laborer fell from barge. (Not wearing life preserver. Unguarded opening.)
3. Deckhand asleep in launch when it swamped. (Short lashing had been made between launch and working dredge.)
4. Laborer fell from a mattress weaving barge. (Not wearing life preserver.)
5. Deckhand on dredge fell overboard. (Not wearing life preserver.)
6. Deckhand died of exposure due

Continued on page 51

NEWCO WIRE ROPE
CLAMP
AND THIMBLE

SIZES TO FIT WIRE ROPES FROM ¼" TO ⅞" IN DIAMETER

DEVELOPS 85 TO 90% OF ULTIMATE ROPE STRENGTH (95-100% CATALOG LIST)

THE HEAVIER THE LOAD THE TIGHTER IT HOLDS!

PAT. PEND.

The most efficient attachment for wire rope because of combined strength and design. Permanent castings, standard replaceable bolts and nuts. NO WRONG SIDE—threads either way. Easy to install in field or shop, and never needs lubricating.

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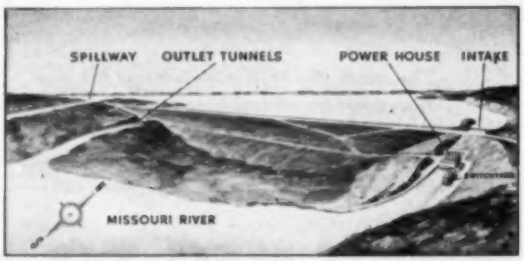
DEPT. E10 BOX 5905 KANSAS CITY 2, MO.

Big Red TD 24

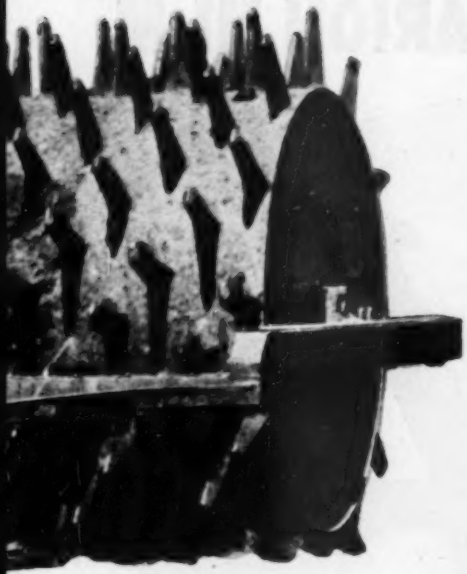
BREAKIN' SHALE ON THE BERM. TD-24 pulls a 60,000-lb. capacity spike-tooth roller, evening surface of uncompacted berms. Five TD-24s are literally "all over the place" on this big project's toughest jobs.



ARTIST'S CONCEPTION OF OAHE DAM at completion in 1959. Power works above will provide 420,000 kw with 6 generators, twice as much power as South Dakota produces at present. 78 million cubic yards of earth are involved.

BIG RED REALLY KEEPS THE LOADS MOVING—Whether it's pushing or pulling, TD-24's great power and speed enable it to move more pay dirt faster.

Rolls Out the Wrinkles on Oahe Dam



Five International TD-24s star on dam project, harnessing the "Big Muddy," creating a 250-mile lake and irrigating two million South Dakota acres.

Contractor's superintendents, dirt boss and skinners at the big Oahe Dam project on the Missouri River near Pierre, South Dakota—all will bend your ear about "Big Red."

Operator Troy Hood goes on record: "Cutting on a curve, TD-24's Planet Power steering keeps both tracks pulling so you keep all power working to do a faster job."

Here's another TD-24 skinner, Jack Rank: "Son-of-a-gun really has got the power. Much easier to handle than other tractors, easier to work, easier on me. I'm on it 10 hours a day, so I know."

Dirt Foreman Sam Crawford backs them up: "TD-24 can't be beat. We haven't found anyplace it won't go."

John P. Beck, general superintendent for subcontractor Campbell-Collins, has high praise for "Big Red": "We're well satisfied with our TD-24s. Their speed in reverse certainly is an advantage as no time is lost between pushing runs behind our ten scrapers."

There they are—solid reasons for TD-24 preference by the men who move the dirt.

Take their word for it. See your nearest International Industrial Distributor for the facts behind enthusiastic TD-24 performance reports making the rounds. Find out how he backs up the power he sells with full stock of parts, factory-trained mechanics, and the latest service equipment, to keep your equipment in the high output bracket.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

"WE LIKE TD-24 POWER," says John P. Beck of Campbell-Collins (left). Looking on are F. A. Bleecker of Guy H. James Co., prime contractor; L. G. Leavitt, area engineer; and F. P. Evans, office engineer.

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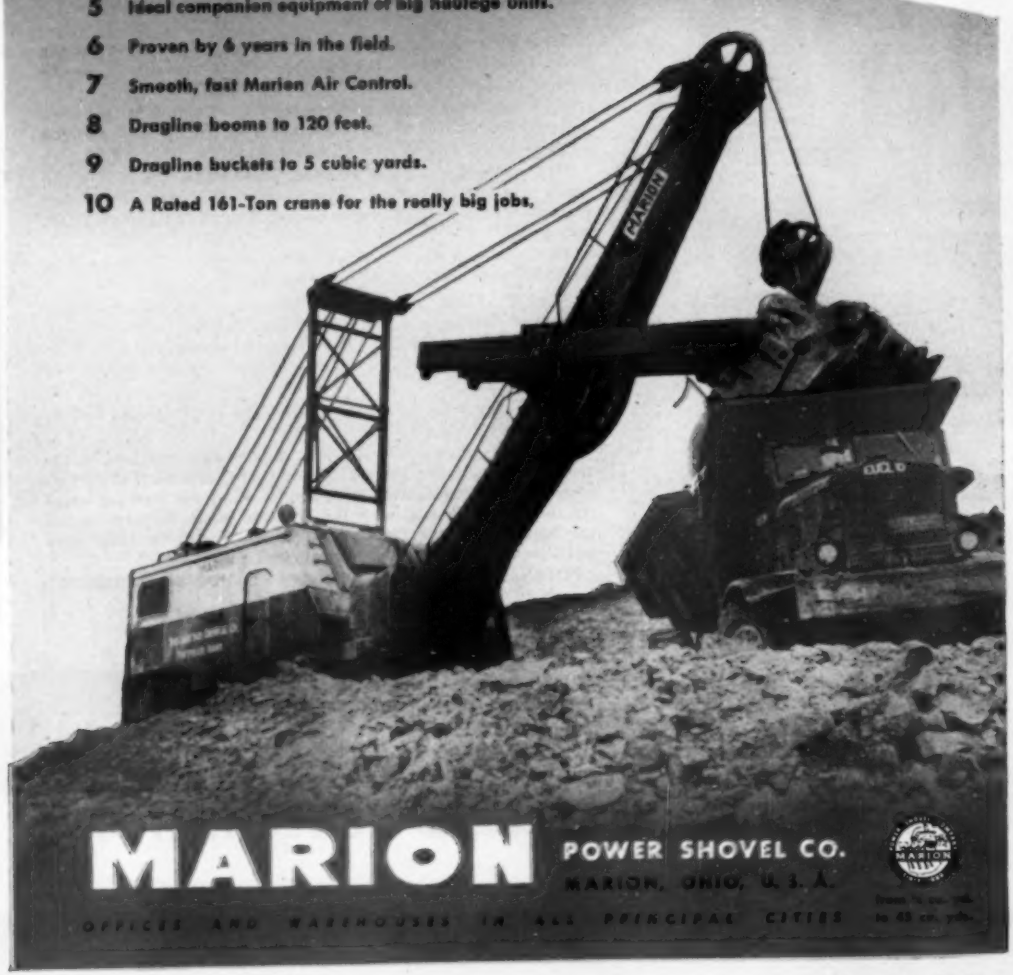
POWER THAT PAYS

BASIC FEATURES
That Really Count!

Get them in the

MARION 111-M

1. Four cubic yard dipper capacity.
2. Electric swing on a diesel machine.
3. All-electric if desired.
4. Ships on two rail cars.
5. Ideal companion equipment of big haulage units.
6. Proven by 6 years in the field.
7. Smooth, fast Marion Air Control.
8. Dragline booms to 120 feet.
9. Dragline buckets to 5 cubic yards.
10. A Rated 161-Ton crane for the really big jobs.



MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

News from the Field

Discover Sulphur Deposit on Mississippi Delta

Discovery of a large new deposit of sulphur which is expected to be a major factor in solving the current world shortage of this essential mineral was announced by Freeport Sulphur Co.

To develop the deposit, located at the mouth of the Mississippi River, Freeport will build a $10 to $15 million mining plant having a production goal of 500,000 long tons of sulphur a year, John Hay Whitney, chairman of the board of directors, and Langbourne M. Williams, Jr., president, said. The mine is expected to be ready for operation in 1953.

Garden Island Bay, the site of the newly found deposit, is located in the marshes of the lower Mississippi River delta 100 miles southeast of New Orleans. The deposit is native sulphur, or brimstone, which is the cheapest and purest of the various forms of the element. The sulphur occurs in a typical salt dome formation.

Construction Contracts Let in Alaska

Activity of the Corps of Engineers' contract market continues with two contracts totaling nearly eight million dollars being awarded.

Contract for the construction of two airmen's barracks at Elmendorf Air Force Base went to L. E. Baldwin Inc. of Seattle, who last week underbid six competitive bidders with a low of $3,481,400.

The second contract for construction and installation of outside utilities at Eielson Air Force Base in the amount of $3,492,460 was awarded to joint-bidders Lytle, Green, Birch & Boespflug.

Official notice to proceed with construction has been given to these Iowa, Montana, and Washington firms.

Survey Miss. River Crossing at New Orleans

A proposal for the employment of an engineer or group of engineers for approximately $25,000 to make a feasibility survey of the construction of a Mississippi River crossing at New Orleans was approved by the New Orleans Commission Council.

Mayor Morrison announced that the council would meet later to select engineers to make the survey, which will be designed to bring up to date the 1946 report of Robert Moses of New York recommending construction of a bridge spanning the river from Calliope to the vicinity of Lamarque in Algiers.

Louisiana's State Department of Highways earlier signed an agreement with the city of Gretna, which wants a bridge with one approach at Gretna, for a $200,000 bridge survey.

N. Y. State Hy. Engineers Announce '52 Convention

The New York State Association of Highway Engineers are holding their 13th Annual Convention at the Hotel New Yorker, NYC, on March 19-21, 1952.

Harry Spitzer, Box 38, State Office Building, Babylon, L. I., N. Y., is the convention secretary.

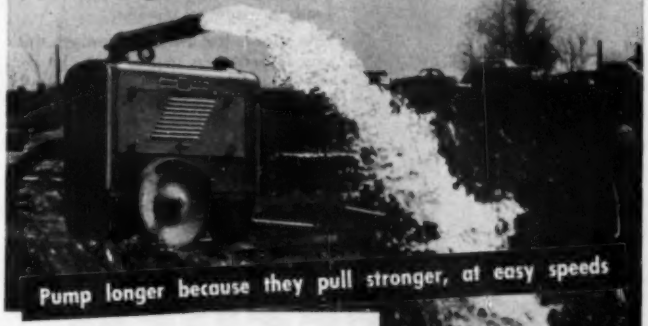
Sagging Bridge Pier Supported with Jacks

A bridge pier on the Peace River Bridge on the famed Alcan Highway was sinking and tilting. The problem was to provide adequate support until the undermined foundation could be replaced.

● Two banks of five jacks supported sagging Peace River Bridge pier for more than 60 days. One bank is shown in position. Jacks were later recovered and restored for future use.

A cofferdam was driven around the pier so that a steel reinforced concrete sub-foundation could be laid. The cofferdam was then allowed to fill with water and divers sent down to put the jacks into operation. Ten Simplex-Jennies were placed at the base of the pier on the new concrete sub-foundation. Once in place and adjusted, they sustained a load of 800 tons for more than 60 days, and were entirely sub-

A Jaeger never races to prime



Pump longer because they pull stronger, at easy speeds

Dewatering 1500' of 8' x 14' deep sewer trench at a river crossing, this 4" Jaeger pump handled 40,000 gph at average speed of only 1200 rpm (10% to 15% lower speed than other pumps), and reprimed quickly, as needed, at 1400 rpm (compared with 1800 to 2000 rpm required to prime ordinary pumps). This is typical performance. Jaeger's larger shells and impellers, double priming action and use of largest engines applicable mean high efficiency, fuel economy, long life — in 1½" to 10" pumps.

See your Jaeger distributor or send for Catalog P-10

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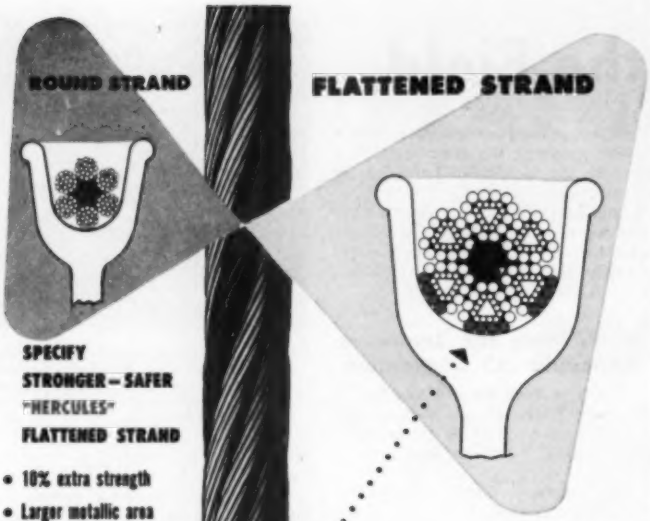
COMPRESSORS • MIXERS • HOISTS • TOWERS • PAVING MACHINERY



SPECIFY
STRONGER—SAFER
"HERCULES"
FLATTENED STRAND

- 18% extra strength
- Larger metallic area
- Smooth running
- Smooth wearing
- Easier to rig
- Extra safety
- Extra economy
- RED STRAND quality

SPREADS THE LOAD
FOUR WAYS

"Hercules" Flattened Strand design spreads wear over four wires—not just one as in round strand. This compact outer surface greatly reduces wear in grooves of drums, sheaves and idlers. Tends to keep them smooth.

The triangular cross-section of the strands permits a smaller core, larger contact area between strands, and greater resistance to crushing. A smaller size Flattened Strand rope can usually be used for the same strength and safety requirements as round strand. Makes for easier rigging in tough spots.

Take advantage of the greater strength and economy of "Hercules" Flattened Strand Wire Rope.

LESCHEN
WIRE ROPE

Consult our Engineering Department for specific recommendations. A. LESCHEN & SONS ROPE CO., 5909 Kennerly Ave., St. Louis 12, Missouri. Distributors in all principal cities.

merged during this period which was allowed for stabilization of sub-foundation.

Accurate pressure adjustment for each jack was achieved by installing them in banks of five each with a hand pump and reservoir for each bank hose connected in manifold. In this way, all five in each bank were loaded equally.

After the water was pumped from the cofferdam, the jacks were protected by forms so they could be removed after the concrete was poured and hardened.

Mine Lead and Zinc by Open Pit Method

The importance of lead and zinc as strategic materials for this country's rearmament program has been magnified many times during the past year. It has caused mining people to study new methods for the extraction of these vital ores from areas previously considered "mined out."

In the Tri-State mining district, ore recovery by open pit mining is proving successful for Potter and Sims of Joplin, Mo. Long considered impractical to extract, ore located in veins near the surface is now being recovered economically and at a rate that is assisting our defense effort considerably.

The Tri-State area includes portions of Missouri, Kansas and Oklahoma. In recent years this field has produced over 40% of the zinc and 12% of the lead mined in the U. S.

Conventional mining methods are primarily centered in the northeastern corner of Oklahoma, around the town

• Lead and zinc ore is loaded out of the open pit mine by a Koehring 605 shovel, Caterpillar D8 tractor and No. 80 scraper.

of Picher. Here the more orthodox procedure of sinking shafts and burrowing many miles of underground drifts is still followed. Mechanization of these underground mines has added greatly to the output of the area.

But the operation that is making history is the stripping of shallow ore.

The locale of this new venture is some nine miles north of Joplin, at the site of an old conventional shaft mine. This area was, for all practical purposes, abandoned when the richer fields around Picher were opened up some 30 years ago.

Now the emphasis is on reworking old mines and using new methods to work previously unexploited fields.

George W. Potter, Joplin, and Dewey Sims, Miami, Okla., first considered this stripping method seriously

• Caterpillar D8 tractor and No. 80 scraper is shown loading during stripping operations in the Tri-State mining district.

in May, 1950. During June and July drillings were made which proved that there was sufficient ore bearing material present to make stripping feasible. In August initial removal of overburden was begun. This work was and still is being done by Grove and Snyder, Inc., contractors, Asbury, Mo. The first ore bearing material was reached September 15, at a depth of 26 feet. A week later the mill was started with one shift. By late October it was working three shifts and has been in continuous operation ever since.

Since last August more than one million yards of ore and waste material have been removed. The pit is now 120 feet deep and present plans are to excavate to a depth of 200 feet. Best estimate is that another one million yards of material will be removed before reaching this depth. At the present time the ratio of waste to ore bearing material is approximately five to one, but the percentage of millable material is expected to increase.

Opening this pit has not been a simple task. Conditions change daily, with unexpected rock formations, changing directions of ore deposits, weather and the ever present danger of slides and cave-ins. Operating procedures too must change to cope with different conditions.

In September, before ore had been reached, a flash flood hit and filled the hole with water. The pit was pumped out, but remained so filled with slime that only a dragline loading into

Powered by Customers' Tractor-mounted Winch.

DETACHED, LOADED & RE-ATTACHED

Ready to GO!

ROGERS
POWER LIFT
DETACHABLE GOOSENECK
TRAILER
PATENTS PENDING

RAISES ITS DECK TO CLEAR HIGH BANKED CROSSINGS
STOOPS TO CLEAR LOW OVERHEAD OBSTRUCTIONS
CARRIES HEAVIER LOADS MORE PROFITABLY ON LARGER TIRES

Frame is lowered to ground without need of blocking. Maximum height of 16" assures rapid, safe loading of equipment.

Complete Literature available upon request — Any Rogers Dealer will demonstrate its features right on your desk, with an OPERATING SCALE MODEL.

DEVELOPED BY
The Trailer Pioneers
ROGERS BROS. CORP.
ALBION, PENNA.
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Also of timely interest is this ROGERS Tag-A-Long trailer which makes a dump truck serve as a tractor and effects sizeable savings for contractors.

Ask the men who live with wire rope...

They insist on genuine

CROSBY CLIPS

Drop-forged
Hot dip galvanized
SIZES FOR ALL WIRE ROPE
DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
ST. PAUL 1, MINNESOTA

● Lead and zinc mine located near Joplin, Mo. Ore is mined here by a stripping process similar to that used in open pit coal mining.

trucks could remove the overburden.

Initial ore removal was by shovels, with trucks hauling to the mill site and dumping on a stockpile. An Osgood 200 dragline moved the material from the stockpile to the mill hopper. When steeper grades were encountered, rubber-tired Diesel hauling units were utilized and production was upped to 50 tph delivered to the mill.

A sleet storm was responsible for the present method of loading out the ore. Only crawler tractors could negotiate the steep sleet-covered haul road. Previously these units had been used only for stripping and hauling overburden. Snyder added an International TD-24 and three D8s to do the job. Three Diesel tractors haul ore, one push-loads when conditions permit and the remaining equipment continues to strip overburden.

With the pit at a depth of 120 feet, and the pit floor somewhat limited in diameter, present operations consist of a 1½-yd. Koehring 605 shovel loading three Caterpillar No. 80 scrapers. Daily delivery to the mill totals more than 1,500 tons of ore bearing dirt. When the pit diameter is increased to permit push loading of the scrapers, there will be an estimated 25% increase in this figure. Daily production has reached as high as 4,500 tons.

The mill has a 24-hour capacity of 1,400 to 1,700 tons of ore, and produces from 40 to 60 tons of lead and zinc concentrates a day. The ratio is presently about six tons of zinc to one of lead. To extract ore economically from the slate and soapstone in which it is deposited, a new stage has been added to the otherwise conventional milling procedure. An Allis-Chalmers 6x20-ft. trommel screen applies a spray of water under a pressure of 70 pounds psi to separate the ore from the dirt. The addition of this washing process reduces per ton milling costs to about one-sixth of the conventional method and increases the hourly output six to seven times.

Stage One at Oahe Dam Nears Completion

At Oahe Dam, S. D., F. A. Bleecker, superintendent for the prime contractor, Guy H. James, expects to be finished with Stage One before the end of November, 1951, the old target date.

Big equipment working a 22-hour, two-day shift is speeding construction

Get These Advantages In Your Quarry Drilling Operations

Investigate the important economies you can effect with a Bucyrus-Erie 20-W or 22-W churn drill handling your blast hole drilling operations. Highly versatile, these rigs open up a two-way road to added profits for you.

Stepping from its natural task of water well drilling, a 20 W or 22-W rig can put down blast holes in the 4- to 6-in. range speedily and efficiently, giving you low per-foot costs on drilling plus the economy advantage of larger diameter holes. And, if blast hole work is slack, the same machines can effectively handle water well drilling jobs for added income — another big advantage.

Look over these machines in planning new equipment purchases; write for further information today. 126W51

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SOUTH MILWAUKEE, WISCONSIN

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EASY TO SERVICE

▶ Allis-Chalmers' new tractor line is blazing the way to simpler servicing with time and money savings never before possible.

▶ Adjustments are easier . . . lubrication simplified and lube periods greatly extended. Mechanics say these are the easiest tractors they have ever worked on!

▶ This all adds up to less down time, more producing time...longer tractor life at less upkeep cost.

▶ Following are just a few reasons why this NEWEST, FINEST TRACTOR LINE ON EARTH is *Easy To Service*...besides being built to "take it," easy to operate and entirely new in performance. Get the full story from your Allis-Chalmers dealer.

TIME-SAVING LUBRICATION DESIGN — Only a few lube points, easy to get at — NONE UNDER TRACTORS. You operate *75 HOURS* without any greasing — then only one fitting to hit and an oil change to make. (Only exception, torque converter bearings on HD-20). You lubricate the Positive-Seal truck wheels, support rollers and idlers only once every *1,000 HOURS!*

ACCESSIBLE ADJUSTMENTS — ***QUICKLY MADE*** — brakes, master clutch, steering clutches. No floor plates to remove for any adjustments. Tracks easier to adjust — simple screw adjustment with automatic lock.

EASY TO REPAIR — Engine, master clutch, transmission, steering clutches and final drives can be easily removed and repaired or replaced, *without disturbing adjacent assemblies.*

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The Newest, Finest Tractor Line on Earth!

40.25 drawbar hp.
11,250 lb.

70 drawbar hp.
18,800 lb.

102 drawbar hp.
27,850 lb.

Hydraulic Torque Converter Drive
175 net engine hp.
41,000 lb.

- DESIGNED FOR YOUR JOB
- BUILT TO "TAKE IT"
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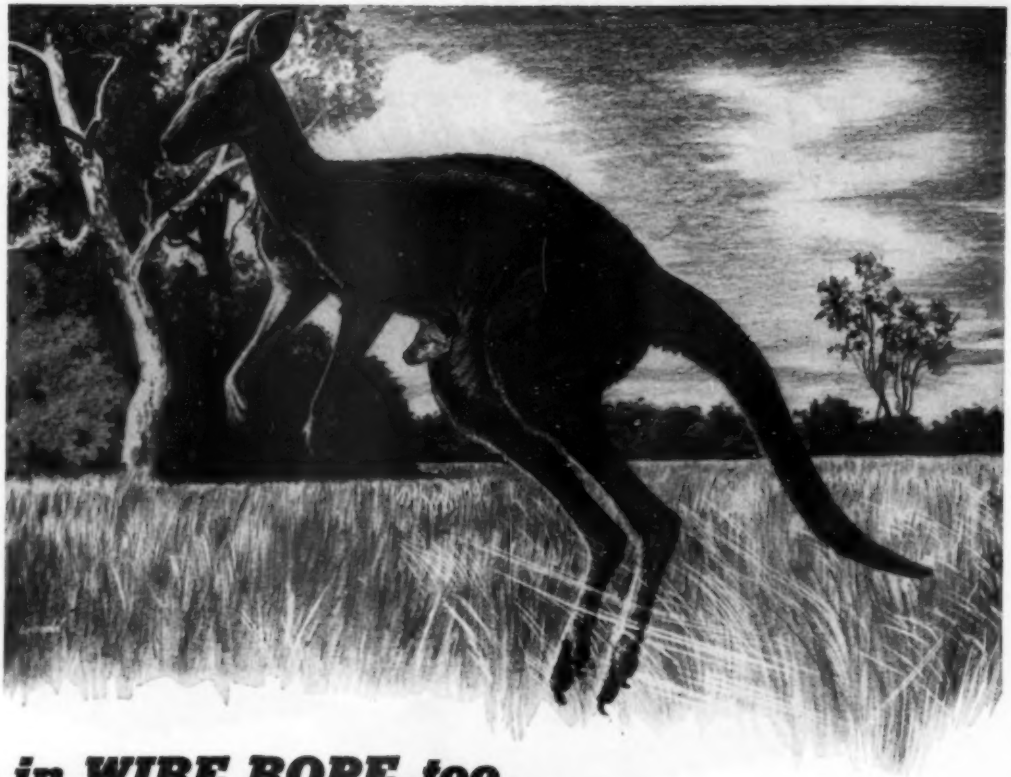

in WIRE ROPE, too the RIGHT KIND of muscle makes the difference

Endowed with highly specialized leg muscles, the kangaroo is able to make tremendous flying leaps—even with Junior perched in the rumble seat.

In wire rope, too, specialized jobs call for specialized muscles. That's why in Wickwire Rope we make sure you always get the proper combination of physical properties to best resist the destructive forces found on your particular job—whether it be abrasion, load strain, shock stress or bending fatigue.

Wickwire Rope gives you the benefit of long experience and specialized know-how which assures you of exactly the right kind of rope your particular job demands.

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LOOK FOR THE YELLOW TRIANGLE ON THE REEL

WICKWIRE ROPE

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PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

of the rolled-fill main embankment abutment, uncompacted shale berms and outlet works channel on the west or right bank, Mr. Bleecker reported. Close schedules are maintained even though the Stage One contract was increased from six million yards to eight million five hundred thousand yards last winter.

Oahe is the second largest dam in the Pick-Sloan plan for development of the Missouri Valley. Its reservoir will extend from the dam site, six miles north of Pierre, 250 river miles north to Bismark, N. D. With a potential capacity of 420,000 kw, Oahe will ultimately generate more power than Fort Peck, Garrison, or Fort Randall installations at their estimated peaks. The finished dam will contain 78 million yards of material and is scheduled for completion in 1959. The Corps of Engineers, Omaha District, is directing the project.

Construction for Stage One began July 17, 1950. Two million two hundred thousand yards of material was placed during the 1950 work season. This season an additional 6,300,000 yards of material will be added. Approximately half will be overburden and half shale. In addition to the earthwork, Stage One includes a five mile oil mat access road from Ft. Pierre to the dam site along the right bank which is now completed. Craeger Brothers and Issacs Construction Co. of Ft. Pierre were the contractors. Also completed this spring was a spur track paralleling the road, connecting with the Chicago and Northwestern Railroad at Ft. Pierre.

Guy H. James, prime contractor, is excavating shale material from the outlet works channel and using it for construction of the up and down stream berms. James loads shale with two Lima 1201 4½-yd. shovels. In the muddy conditions existing in early June, an International TD-24 with Bucyrus-Erie pusher plate was used to push the 25-yd. Euclid bottom-dump wagons out of the pit after loading. The Euclids haul the material a quarter of a mile to the berm area and dump it in windrows where it is spread in 18-in. lifts. The spread shale is then further broken up by four passes from a special spike tooth roller having an 18-in. spike. This roller, designed and built by the Corps of Engineers, is being used with 40,000 pounds ballast and is drawn by a TD-24 crawler.

Campbell and Collins, subcontractor, in moving 2,500,000 yards of overburden for the main embankment is using Model A Tournapulls. Most of this material is being push-loaded from a borrow area in nearby hills with the help of a TD-24 and a D8. The loading run is 200 feet with a ¾-mile haul one way down a grade averaging 5%. Units average four to five loads per hour.

The embankment area is divided into four zones corresponding to the perviousness of four classes of material used in the fill. The upstream ⅓ contains the least pervious silt-clay material. The downstream zones are successively less pervious as the overburden deposited ranges from gravelly clay to sand and gravel. Material is classified as it leaves the pit, and each scraper load takes a colored flag corresponding to those for the zone taking that kind of material.

As material is laid down in its proper zone, it is dozed into 8-in. (uncompacted thickness) lifts, moistened and rolled six times with 30,000-lb. sheepsfoot rollers giving a compaction of 608 psi. A compaction of 90% or better at optimum moisture content is achieved.

When completed, the dam will be a mile and three quarters long across the top of the embankment. (The present river course is 4,000 feet wide at that point.) It will be 60 feet wide at crest and 4,400 feet thick at its base and at its maximum will be 242 feet high.

The outlet will be 100 feet wide at grade and will contain six 3,450-ft. tunnels with an effective diameter of

HOPTO
DIGGER • CRANE • SHOVEL
• CUTS COSTS
• HYDRAULICALLY CONTROLLED
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OVER 2000 POUNDS CAPACITY—MOVES 15 TO 30 YARDS
Used With All Tractors—Mounts On All Trucks 1½ Tons or Larger
Now, with the low-cost Hopto you can have three units in one: a Back Hoe Digger that digs down to 9 feet and still lifts high to load the highest trucks . . . a shovel for digging or loading of materials . . . a crane that safely and easily handles construction materials and equipment. No swinging counterweights, full 180° swing and smooth, hydraulic operation are features that mean savings on hundreds of jobs. Enclosed, skeleton, and shovel buckets are available in 14-24 inch widths. Heat treated cast alloyed, steel teeth are reversible for longer life. Hopto has many of the features that have made these Badger machines popular:
FULL TRACK
RUBBER MOUNTED
P.T.O. TRENCHER
WRITE FOR FREE FOLDERS
BADGER MACHINE CO.
WINONA, MINNESOTA • DEPT. No. 2

• Dumping, spreading and compacting go on night and day as shown in this view looking east over the west abutment embankment at Oahe Dam, Pierre, S. D. This work will bring embankment to within 200 feet of river at grade when Stage One is completed in November, 1951.

19½ feet upstream and 18½ feet downstream. Tunnels will have a reinforced concrete lining three feet thick. These tunnels will check discharges for flood control and navigation. They will end in a spillway basin to dissipate the energy of the water discharged at a high rate. Flow will be regulated by gates located in reinforced concrete shafts 258 feet deep near the center of tunnels. Two hundred eighty-six thousand yards of concrete will be placed for the outlet works and 23 million yards will be excavated for the completed channel.

Power works for the dam will be constructed on the left bank and will include six 1,700-ft. tunnels similar to those in the outlet works. Each will have an inside diameter of 23 feet. The potential power output of 420,000 kw will be provided by five dynamos. This is better than three times the power generated in the whole state of South Dakota at present. Thirty-three million yards will be excavated for making the power works channels. Two hundred eighty-six thousand yards of concrete will be used in construction of the power facilities.

A 5-mile spillway, for relief of the dam in case of unprecedented flood, will be constructed 6,000 feet west of the right abutment. The spillway will contain an ungated shoot spillway of 337,000 cfs capacity. Excavation for the spillway will require the removal of 54 million yards of shale and overburden. This material will be used to close off the coulees that now cross the projected course of the spillway. The spillway structure will require 360,000 yards of concrete. Work on the spillway will not begin until completion of dam.

Contractor's superintendents on the job are F. A. Bleecker for James and J. P. Beck for Campbell-Collins joint venture. Representing the Corps of Engineers, in charge of Stage One Earthwork are L. G. Leavitt, area engineer; F. P. Evans, office engineer; and L. R. Crist, resident engineer.

The contractor's labor force totals 275 people for Stage One. There are 25 government employees working on the project and in addition another 150 are doing preliminary drill test work in and around the project area.

One of the major purposes of the dam besides flood control and hydroelectric power is irrigation. It is planned that two million acre feet of water will be provided annually from Oahe for the irrigation of 750,000 acres in the James River Valley in east central South Dakota. Water for this area is to be pumped through a 125-mile canal with a storage reservoir at Blunt, S. D. and a power installation at Miller, S. D. Irrigation and power will be handled by the Bureau of Reclamation. Land adjacent to tributaries of the Missouri emptying into the Oahe reservoir will also receive irrigation.

It is estimated that at peak construction, the population of the Pierre area will be increased by 10,000 people. Peak employment is set at about 3,000. Besides small trailer villages near contractor's shops at the construction site, 52 war housing units at Pierre Army Air Base have been reconditioned by the government. More government housing in an area adjacent to Pierre

DREDGES

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DIPPER
CLAMSHELL

Bolted sectional steel hulls for landlocked, inland waters

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AMERICAN STEEL DREDGE CO. INC.
FORT WAYNE 1 · INDIANA · U.S.A.

DESIGNERS AND BUILDERS OF DREDGING EQUIPMENT SINCE 1905

• Dirt Foreman Sam Crawford, right, talking things over with two TD-24 operators, Jan Rank, center, and Troy Hood, left, between shifts of Stage One operations at Oahe Dam. These men work for contractor Guy H. James of Oklahoma City.

Donald F. North

Donald F. North, long-time explosives sales and service man for Hercules Power Co., Pittsburgh, Pa., died August 18. He had been ill with a heart condition for several weeks.

A native Pennsylvanian, Mr. North was born in Eleanora, Pa. He graduated from Pennsylvania State College in 1918 with a B. S. degree in mining engineering and received a master of engineering degree from the same college in 1930.

After graduation, Mr. North worked in mines in Pennsylvania, West Virginia, and Ohio, as foreman and production engineer. He became associated with Hercules Power Co. in 1925 as a member of the service division of the explosives department. He spent five years in Wilmington, then transferred to the Pittsburgh office in 1930.

He is survived by his widow, and a son, Donald Fulton North, Jr., who reside at 622 Royce Ave., Pittsburgh; and a brother D. Curt North of Mt. Pleasant, Pa.

is being planned.

No major relocation problems are anticipated. The largest relocation will be several miles of Highway U. S. 12 and large bridges and new roadbed for the mainline of the Milwaukee Road in the vicinity of Mobridge, S. D. About 4,000 people must be displaced before the reservoir is filled.

Future Shortage of Engineers Cited

With a national need for 30,000 engineering graduates every year, a shortage of 5,000 next year, 21,000 in 1953, and 18,000 in 1954 is to be anticipated, according to Morton O. Withey, dean of the College of Engineering at the University of Wisconsin.

Withey, writing in a recent issue of *The Wisconsin Engineer* magazine, based the estimates on current enrollments and on figures which show a large demand for civil, chemical, electrical, mechanical, mining and metallurgical engineers.

"Without even considering the effects of the present emergency in world conditions in reducing the potential supply, it is evident that the country is faced with a decided shortage of engineering graduates," Withey says.

"Events in World War II brought to the attention of many industries the necessity of maintaining larger and better technical staffs to meet competition," he adds. "Furthermore, the loss of scientific personnel in Europe during the war has made it more imperative that we in the U. S. provide more highly trained leaders in science, in engineering, and in other professions, if we are to maintain leadership in world affairs."

Release Missouri River Basin Pollution Report

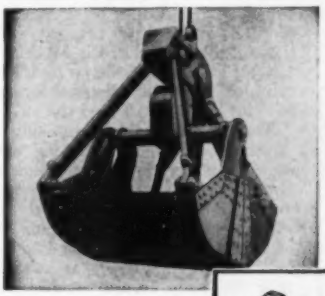
Sewage and waste treatment projects estimated to cost $149 million are recommended at 677 municipal and industrial locations in the Missouri River Drainage Basin to bring water pollution under proper control in an area extending to 10 states. This recommendation is contained in a cooperative state-federal report on water pollution in the area which is one of a series on the major drainage basins of the country being prepared under authority of the Water Pollution Control Act of 1948.

Data and knowledge now available are sufficient to define most of the pollution problems within the Missouri Basin without awaiting the results of additional surveys and studies, the Public Health Service said. These data were described as adequate to designate cities and industries which contribute pollution to the basin, and in most instances to determine the degree of treatment individual sources of pollution will require. It is now the responsibility of cities and industries to develop engineering studies leading to the construction of sewage treatment works, the Public Health Service said.

The report describes water pollution conditions in an area of 521,000 square miles having a population of 8,200,000. It estimates that the initial cost of required municipal treatment plants in the Missouri Basin, including revisions to existing plants where required, will be approximately $115 million. It is expected that the initial cost of industrial waste treatment, exclusive of industrial waste now discharged to municipal sewerage systems, will be $34 million.

The 677 sewage and waste treatment projects needed in the basin include 593 for municipalities (many of which handle industrial as well as domestic wastes) and 84 for industries. Industry needs 70 new plants, enlargements or additions at 13, and 1 replacement.

ERIE *Barge Type* Bucket



In this type the large deck area achieved means bigger payloads in stock piling and barge rehandling work. Erie's booklet on 2-line buckets gives you complete data on this type and 3 other classes of Erie Buckets. Write for copy today.

Compare **DECK AREA**

¾ Yd.	27.21 Sq. ft.
1 Yd.	30. Sq. ft.
1¼ Yd.	32.3 Sq. ft.
1½ Yd.	38.7 Sq. ft.
1¾ Yd.	42.4 Sq. ft.
2 Yd.	45.1 Sq. ft.
2¼ Yd.	53.5 Sq. ft.
2½ Yd.	57.6 Sq. ft.
3 Yd.	60.9 Sq. ft.

Write for Catalog **2L-2** *Today*

ERIE
STEEL CONSTRUCTION COMPANY
420 GEIST ROAD • ERIE, PENNSYLVANIA

Equipment You Ought to Know About

Gravel Plants

Manufacturer: Pioneer Engineering Works, Inc., Minneapolis 13, Minn.

Claims: Two new portable duplex crushing plants. Both plants employ the Pioneer principle of bottom deck feed, and are designed to offer greater screening area and to permit balanced crusher loads through adjustment of the jaw crusher setting.

The two plants are identical except for the size of the jaw crusher. The 25V has a 10x36 jaw. The 24V has a size 10x24. Both models are equipped with a 24x16-in. double roll crusher. The 3x10-ft., 3½ deck, vibrating screen provides 60 square feet of effective sized material screening area. Both plants are fed with swivel type field conveyor equipped with a 24-in. mechanical, reciprocating plate feeder. Delivery of sized material is handled by a 24-in. x 25-ft. channel frame conveyor.

Travel height of both plants is 12 ft. 6 in. Overall length, less feeder conveyor, is 40 feet. Both plants have a 21-ft. wheelbase. Travel weight of the 25V, without power unit, is approximately 46,000 pounds; of the 24V, approximately 42,100 pounds.

The plants are pneumatic tire mounted on 12 10.00x20 tires, three axle, with equalizer between the two rear axles.

The 24V and 25V are designed especially for use in areas of restricted highway load limits where, in spite of such weight limitations, reasonably high production of aggregates is required.

Gooseneck Side-Dump Trailer

Manufacturer: Easton Car & Cons. Co., Easton, Pa.

Claims: Semi-trailers of gooseneck construction employing two side-dump body designs are now being manufactured. First of the new gooseneck trailers to be completed is Model TL-1015, a lift door side-dump of 15 tons capacity. The unit is designed for service with the DW10 Diesel tractor.

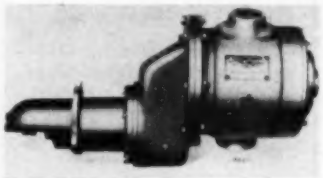
The lift door body is especially designed for fixed point dumping, using the Easton electric overhead dumping system. The push-button controlled overhead hoist operates a dual hook which engages the two dumping bars on the lift door. The door is raised clear of the load, then serves as a bail to raise the body to the complete discharge angle. Stabilizer feet, incorporated with the body hinges at each end, rest on the hopper wall to stabilize the trailer frame as the unit is dumped. The maximum dumping angle is 70°.

Lift door trailers of the same design will be available to 30 tons capacity, for use in combination with a larger tractor. The new line of side-dump gooseneck trailers will also include 15 and 30 ton automatic drop door, hydraulically dumped units for pit, mine and construction services.

Air Starting Motors

Manufacturer: Ingersoll-Rand Co., NYC.

Claims: Two new air starting motors for cranking gasoline and diesel engines that are expected to be used in



the lumbering, petroleum, mining, heavy construction and power fields. They are designed for cranking diesel and gasoline engines with piston displacements up to more than 3,500 cubic inches. Although normally operated by compressed air, they are also suitable for operation on natural gas where available at sufficient pressure.

Smaller and more compact than equivalent electric starters, these air starters give reliable starting service at all times. They eliminate the necessity of generators, banks of storage batteries, and the costs of battery maintenance and replacement. They are not affected by climatic conditions.

An additional advantage is the ease of installation. The housing of the air starting motor can be rotated on the

Civil Engineering Graduates

The Virginia Department of Highways offers you:

1. **A starting salary of $3,536.00.**
2. **Generous periodic raises every six months of satisfactory service.**
3. **Job security plus sick leave, paid vacation and retirement benefits.**
4. **A future with a highway organization that has an enviable tradition for accomplishment.**

80 vacancies now in the Graduate Training Program of the Virginia Department of Highways.

A 48-month program offers training in every phase of construction and maintenance, surveying, bridge and road design, materials testing, research and the administration of a highway organization — under the supervision and direction of top-flight highway engineers with national reputations for progressiveness in highway construction and maintenance.

Virginia's terrain and geography offer you the opportunity to learn every facet of engineering practice.

For complete information write today to: Charles Nelson, Personnel Engineer, Dept. C, Virginia Department of Highways, Richmond 19, Virginia.

gear case, or the gear case rotated on the motor bell housing to clear projections on the engine.

Construction is so simple that any mechanic familiar with internal combustion engine maintenance can service the air starting motor. It consists of a Multi-Vane air motor which cranks the engine through a Bendix drive designed to match the performance characteristics of the air motor. The air motor consists of a solid, hardened steel rotor, revolving in a cylinder of hardened wear-resistant alloy, and enclosed by bronze end plates. The rotor has five vanes to insure a smooth flow of power. Ample-sized ball or roller bearings are used throughout to support all rotating parts, and to give long life, trouble-free service.

The starters are available in two sizes: size 9BM, which develops up to 16 hp and requires approximately seven feet or air per start; and size 20 BM, which develops up to 41 hp and requires approximately 16 feet of air per start. The smaller size weighs 40 pounds, and the larger size, 103 pounds.

Diesel Improvements

Manufacturer: Detroit Diesel Engine Div., General Motors Corp., Detroit 28, Mich.

Claims: Several improvements designed to prolong engine life and further reduce upkeep of series 71 Diesels are announced. Chief among these newly designed features is a new method of oil, water and compression sealing between the engine block and head which does away with the laminated gasket commonly used in internal combustion engines.

The most difficult task of cylinder-head-to-block gasketing is compression sealing. Oil and water passages must also be perfectly sealed to prevent the dilution of crank-case oil. Individual seals were adopted which were designed to place primary emphasis upon compression sealing and secondary but sufficient emphasis on sealing the oil and water passages. Because no over-all or one-piece gasket is used, the new system is called the "metal-to-metal" head and block.

Compression gaskets, in the form of laminated Terne Plate rings, take the major pressure of the head-to-block stud bolts. A small "skirt" on each compression gasket ring fits into a recess between the cylinder liner and the cylinder bore in the block, assuring correct positioning over the cylinder liner.

When the head is pulled down a

Continued on page 45

You Need All 12 You Get All For Extra Life... In Red Arch Buckets

1. **Alloy Steel Body** Strong steel plates are continuously welded to steel corner sections.
2. **Direct-to-Lip Drag** Lips extend forward to drag clevis hitch plates. Drag is direct, not through body to lip.
3. **Integral Hitch Pin Bearing** Riveted to both arch and lip for greatest possible strength.
4. **Sturdy Box-Type Arch** Provides maximum strength with minimum weight.
5. **Alloy Cast Steel Drag Clevis** Clevises are designed as reversible units to provide two different drag hitch connections.
6. **Single Pin Drag Unit** Remove one pin — disassemble drag rope socket from drag chain and drag rope.
7. **Self-Cleaning Hoist Trunnions** Provide free passage of dirt for minimum wear.
8. **Alloy Steel Spreader Bar and Chains** Heat-treated from end to end for extra wear.
9. **Rigid Sheave Frame** Reinforcing webs in back keep it rigid.
10. **Heavy-Duty Runner Bars and Renewable Heel Plates** Provide extra strength and wear-ability.
11. **Reinforced Back Edge** Channel section provides strong reinforcement across bucket back.
12. **Tiger Teeth** Made of forged tool steel, easy to insert, remove and resharpen.

33851C

South Milwaukee, Wisconsin

GET the full story on faster loading, smoother carrying, quicker dumping Red Arch buckets. Sizes ¼ to 30 yards. Write for details.

NOT in the *Contract*

"Tell me, sir, who was braver than Lancelot, wiser than Socrates, more honest than Lincoln, wittier than Mark Twain, and more handsome than Apollo?"

"My wife's first husband."

"Moderation and self-control," said the psychology professor, addressing his class, "can be applied successfully to our everyday lives. Observe, for example, the fly which has just alighted on the tip of my nose. I do not lose my temper; I do not swear and blaspheme; I merely say in a quiet tone, 'Go away, fly.' GAHDAM, IT'S A BEE!"

The housewife heard the tile-setter grumbling to himself as he worked, so finally asked what was the matter.

"This work too hard," he moaned, "I think I go back to Italy."

"Well, wouldn't you have to work even harder for a living in Italy?"

"Whatsamatta, lady, you crazy? Over there we got the Marshall Plan."

A shovel runner, reading about a blizzard in the Rockies, came on an item that told about a young couple who was buried in a snowdrift for 10 hours. He turned to the pretty blond waitress who was serving his dinner in the cafe, and pointed to the article, "Did you read this, my pretty dove? What would you and I do in a case like that?"

Without batting an eye, she replied, "Oh, I think that in about 15 or 20 minutes we'd be ready to swim out."

Overheard at the convention:

"Do you drink?"

"Nope."

"Swell. Here—hold the bottle while I tie my shoe."

A henpecked looking little man was escorting his wife to a concert. They arrived late. "What are they playing?" he whispered to his neighbor.

"The Fifth Symphony."

"Well, thank goodness, I've missed four of them, anyway."

"The information must have leaked out that we plan building a highway through here."

Rosie entertained so many male visitors in the parlor and things were so quiet while they were in attendance that Rosie's Papa finally grew suspicious. One night he told his wife, "I've got a wonderful invention that will help us check up on Rosie. It's a television periscope. Just turn it on when Rosie is in the parlor with her fella tonight. If he holds her hand, there'll be a green light. If he kisses her, there'll be a purple light."

The contraption was set in place, the male visitor arrived, and Papa settled back for a nap. His wife awakened him by shaking him violently. "Come quick, Papa," she cried, "and see the pretty rainbow."

Sam: "I'd like to stop off and have a drink with you, but I have to go home and explain to the wife."

Joe: "Explain what?"

Sam: "How do I know? I'm not home yet."

A fire engine was racing down the street, its siren shrieking, when a drunk came staggering out of a doorway. For three blocks he chased the engine shouting, "Stop, stop!" Finally, out of breath, he dropped to the pavement and shook his fist. "All right for you—you can keep your no good peanuts."

The patient was recovering from pneumonia. He repeatedly asked for food and finally the nurse served him a spoonful of rice. A few minutes later the patient called her and said: "Now I want to read a little. Bring me a postage stamp."

A tree is an object that will stand in one place for years and then jump in front of a lady driver.

Junior: "Mom, Pop wouldn't murder anybody, would he?"

Mom: "Gracious, no. What made you ask?"

Junior: "Well, I heard him down in the basement last night saying, "Let's kill it, Joe."

A fat lady stepped on the scales, not knowing they were out of order. The indicator stopped at 75 pounds.

"Holy smokes," exclaimed a drunk who watched her, "she's hollow."

Customer: "What's wrong with these eggs?"

Waitress: "Don't ask me, I only laid the table."

TL-1530 Trailer with EUCLID

TRS-150 Trailer with GMC

TP-1114 Trailer with FORD

BD-1118H Body with AMERICAN

BP-1114 Body with STERLING

Illustration below shows a double-bottomed EASTON TB-2222H Rear Door Side-Dump Trailer with MACK LR, capacity 45 tons. Investigate these, and other EASTON Side-Dump Trailers and Truck Bodies.

ALL THREE new cement plants chose EASTON SIDE-DUMPS

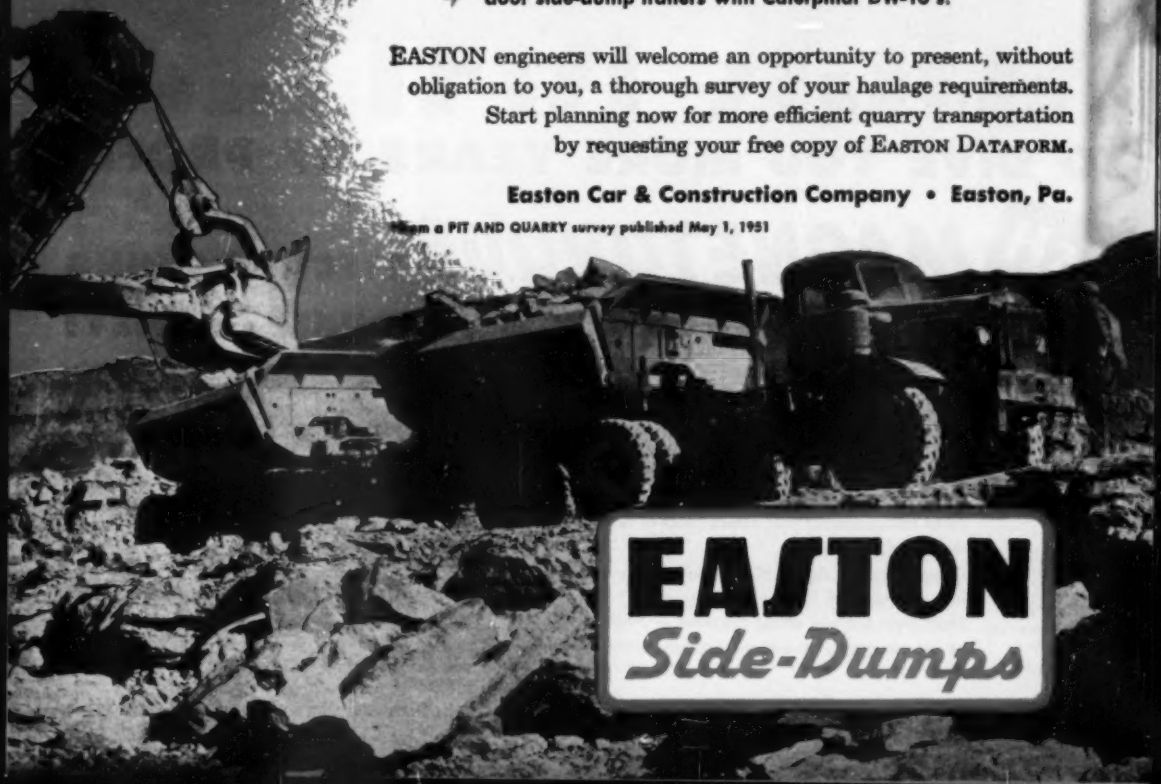
All three of the new cement plants which will operate quarries in the United States (classified as under construction or definitely planned for 1951)*, have chosen EASTON Side-Dumps for quarry haulage.

- **Two of the new plants will use EASTON Model TP-1114 pan type side-dump trailers with Mack LFT's.**
- **One of the new plants will use EASTON Model TL-1015 lift door side-dump trailers with Caterpillar DW-10's.**

EASTON engineers will welcome an opportunity to present, without obligation to you, a thorough survey of your haulage requirements. Start planning now for more efficient quarry transportation by requesting your free copy of EASTON DATAFORM.

Easton Car & Construction Company • Easton, Pa.

*from a PIT AND QUARRY survey published May 1, 1951



EASTON
Side-Dumps

ROCK RATED!

TO GIVE YOU MORE YEARS OF PROFIT

P&H MAGNETORQUE* ELECTRIC SWING

SAVES YOU TIME, TROUBLE, MONEY!

Bring on your heaviest going! The 955-A is ready for it! It's the 2½ yd. companion of the famous P&H 1055 — with all its proved engineering — tough all-welded construction — greater stability — live roller circle — adjustable hook rollers — and many other advancements that assure years of hard service with minimum cost.

Operating advantages? More than you've ever known in a machine of its size. Magnetorque Swing does away with the old swing frictions — with all their headaches — forever. It's faster — 15% to 25% faster.

Ask us where you can see one in operation. Learn what "ROCK RATED" really means.

*T. M. of Harnischfeger Corporation for electro-magnetic type clutch.

P&H HARNISCHFEGER CORPORATION

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Milwaukee 14, Wisconsin

EXCAVATORS • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • CRAWLER AND TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

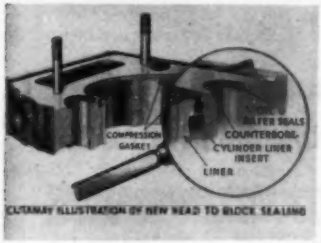
Continued from page 41

positive metal-to-metal contact is assured between the lower surface of the head, the compression gaskets and the cylinder liners. Immediately adjacent to the compression gaskets there are clearances between the head and block of from .007 to .014 inches. This assures positive contact on the compression gaskets and positive compression sealing.

Water and oil passages between head and block are sealed with individual synthetic rubber seals that look like hose washers. These seals fit into grooves machined in the block and are compressed when the head is bolted on, forming a very effective sealing device.

Installation of these seals, both at the factory and in the field, is simply a matter of dropping the proper size seal in the counter-bores. The circular seals come in only two sizes, sufficiently different to be immediately recognizable.

The new series 71 engine blocks are manufactured 1/16 inch higher to



CUTAWAY ILLUSTRATION OF NEW HEAD TO BLOCK SEALING

make up for the difference between the old laminated gasket and the new sealing system. Since other component parts and the crankshaft-to-cylinder-head distance is not changed, the compression ratio is not affected.

A second new feature in the series 71 engine design is a special chilled-and-tempered cast-iron ring which now forms a replaceable seat for the cylinder liner upper flange. One of these is dropped into the counter-bore of each cylinder before the cylinder liner is inserted, effectively prolonging cylinder liner life.

In the new series 71 Diesel engines the angle of the exhaust valve face and the valve seat inserts has been changed from 45° to 30° to reduce the turbulence of escaping exhaust gases and scavenging air.

Other new design features include roll-burnished crankshaft fillets and peened oil holes in the Tocco-hardened crankshaft. Re-design of the block also enabled engineers to improve the retention of intermediate camshaft bearings by installing longer retaining screws.

The improvements are incorporated in current production models of three, four and six-cylinder single series 71 GM Diesels and multiple-engine units ranging from 51 to 800 BHP.

Clamp and Thimble

Manufacturer: Newman Mfg. Co., Box 5905, Kansas City 2, Mo.

Claims: This new product combines a wire rope clamp and thimble in one unit. There is a steel casting with standard replaceable bolts, and the unit is easily installed. It develops 85 to 90% of ultimate rope strength, and affords maximum protection to wire rope. Lubricants are not needed, and the heavier the load, the tighter the halves are forced together. The feature of keying the halves eliminates all shear on the bolts.

Material Handler

Manufacturer: Kalamazoo Mfg. Co., 1827 Reed St., Kalamazoo, Mich.

Claims: A new application is being announced for Model 2500 speed truck.

Powered with a Wisconsin 13-hp engine, it has proven to be a versatile material handling unit. An automotive type, dry plate clutch, and three speed

transmission is used. The final drive acts on both rear wheels.

This truck can now be furnished with a ½-yd. Roura self dumping hopper. Cinders, sand, gravel, cement, concrete, water and most liquid or dry materials can be handled.

Rubber Molding for Vibrator Screens

Manufacturer: Deister Machine Co., Fort Wayne 4, Ind.

Claims: A new type of rubber molding for vibrating screens which snaps on to cross members supporting the screen cloth to eliminate one of the major causes of screen cloth breakage is announced.

The new mounting eliminates "line contact" where the screen normally whips against support tubes. The new molding presents a wide flat special rubber surface to the cloth to reduce abrasion and to spread the point of contact, to reduce friction.

The new rubber "snap on" protective support extends half way around the tubular cross support member and snaps over to a wedge-shaped piece welded to the top of the cross support. The wedge-shaped piece holds the molding in place and at the same time presents a very simple replacement procedure. The new molding also may be applied to the manufacturer's vibrating screens now in the field.

Field Water Container

Manufacturer: Bettis Corp., Houston 11, Tex.

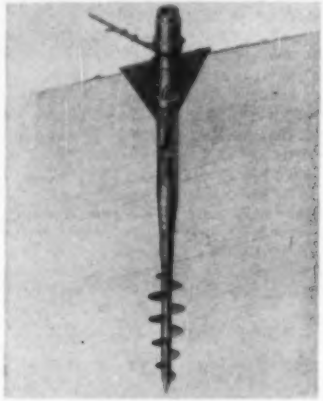
Claims: Portable Igloo water coolers, well insulated to keep water cool or coffee hot a full day and longer, for men working in the field. The galvanized sides are corrugated and seams are double folded for added strength to take rugged handling. Made with or without a push-button faucet which is inset flush with the side to keep from being broken off. A thick layer of Dow Stryofoam between the inner and outer walls make an effective insulation to keep liquids hot or cool many hours. Two heavy carrying handles protect the top cover, which is removed for filling. Made in 1½, 3, 5, and 10 gallon sizes.

Earth Anchor

Manufacturer: Van Dyke Industries, 3625 Cahuenga, Blvd., Los Angeles 28, Calif.

Claims: The EZY Earth Anchor is

an easily installed tool for anchoring guy lines, making dead-man installations, and providing piling and piering for various types of construction. In-



stallations may be permanent or temporary and offer unusual load resistance to tension and compression.

The anchor consists of a pointed steel body equipped with a wide-flange screw which pulls itself into the earth. For average installation 15 turns are required. The anchors may be backed out and reused as needed.

Holding power is increased by the screw's action; soil is not displaced but compacted around the screw blade as the anchor descends. For extreme pulls, two or more units may be installed in line and tied together. In soft, boggy land or fill ground, barrel extensions permit desired depth of penetration. Reinforcing sleeves may also be telescoped over the anchor body to increase strength as needed.

Two-Wheel Scraper

Manufacturer: American Tractor Equipment Corp., Oakland 3, Calif.

Claims: A new 2-wheel, hydraulically-controlled scraper for use with the John Deere "R" Diesel tractor. The new model H-62 is a 6-yd. scraper and will work at speeds up to 12 mph. A special hitch, mounted under the tractor rear axle eliminates the front wheels of the scraper and transfers a portion of the load to the tractor driving wheels. This combination of John Deere "R" wheel tractor and H-62 scraper is in effect a self-propelled scraper. Big pneumatic tires on the tractor and scraper enable the user to haul over pavement and move from one job to another without trucking or freighting.

Cutting edge width for the H-62 is

seven feet; turning radius of tractor and scraper combination is 15 ft. 6 in.; weight, complete with hitch assembly, approximately 7,670 pounds. Scrapers may be had with either single or dual tires. Front wheel assembly may be added so it can be operated as a 4-wheel scraper with either crawler or wheel tractors.

Mobile FM Radio

Manufacturer: Motorola, Chicago 51, Ill.

Claims: New 30 and 60-watt mobile sets are now being shipped with new accessibility design that makes mounting possible in positions where the drawer-type housing could not be installed because chassis withdrawal would have been impossible. Because of the split-housing feature the chassis can be lifted out of the lower section of the housing. Only approximately 1-in. frontal clearance is necessary for

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The ONLY book available that tells...

• HOW TO SAVE YOUR BUCKET

Among the many "bucket saver" suggestions are a list of "do's" and "don'ts" on the use and abuse of clamshell buckets; tips on how to prolong cable life; common operating mistakes that make bucket lips bow in or bend out.

• HOW TO GET MORE OUT OF YOUR BUCKET

"How to Reeve the Bucket for Maximum Efficiency" is illustrated and described in detail. One page is devoted to instructions for operators.

• HOW TO REPAIR BUCKETS

Methods of renewing the cutting edges of worn bucket lips with special welding precautions. This section also contains instructions for removing and replacing ball bearings in lever arm sheaves, lubrication instructions, and many other practical hints for bucket care and maintenance.

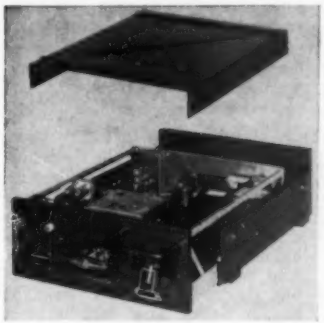
BLAW-KNOX DIVISION
of Blaw-Knox Company
2074 Farmers Bank Building • Pittsburgh 22, Pa.

BLAW-KNOX CLAMSHELL BUCKETS
THE MOST COMPLETE RANGE OF SIZES AND TYPES

unlocking the unit to remove the upper housing section and then lifting out the chassis drawer.

If the unit is mounted so that frontal removal is easier, the chassis can be removed by drawer-action just as was done with former housings. Also, it is possible to take out the chassis by a movement that combines the normal straight withdrawal and a lifting movement.

As a result of this new feature, Motorola mobile units can be mounted in previously inaccessible positions, particularly in the lowered type of trunk design of some new automobiles.



Air-Pressurized Fire Extinguisher

Manufacturer: American-LaFrance-Foamite Corp., Elmira, N. Y.

Claims: A completely new one quart air-pressurized fire extinguisher is now being manufactured. It discharges vaporizing liquid fluid for extinguishing both flammable liquid and electrical type fires. It aims and operates like a gun. No pumping is required, simply aim and squeeze the trigger.

Known as the Alfco Pressurized Fire-Gun, the new extinguisher is easily recharged by adding vaporizing liquid and pressurized with any standard air chuck as commonly used in gasoline service stations.

"Apprentice?"

"I bought a Martin 'Folding Gooseneck' Trailer

NOW I LOAD ANYWHERE ...AND FAST!"

reports Ed Warsaw, Fort Wayne contractor

Warsaw's truck and Martin Trailer arrives to pick up equipment . . .

Unfolding quickly and easily, the "Folding Gooseneck" provides a perfect ramp for all types of equipment . . .

Equipment in place four minutes after arrival, the truck picks up loaded trailer with winch power . . .

Rolling — the loaded unit is low, providing maximum stability under all conditions.

"You can never get into a spot where you can't load a Martin 'Folding Gooseneck' Trailer," says Ed Warsaw, of the Warsaw Construction Co., Fort Wayne, Indiana. "I've loaded every type of equipment over the time-saving 'Folding Gooseneck'."

"The Neoprene rubber mounted tandem floats the load over rough roads we travel. Awkward cranes and draglines ride secure and safe, easily clearing the low bridges in our area. That safety angle is an important one — there's little or no danger of tipping with the 'Folding Gooseneck'. We're sold on this trailer!"

You'll be sold, too, when you see "this trailer" in action! Ask your Martin "Caterpillar" Dealer to show you the Martin "Folding Gooseneck" Trailer's money saving features . . . or write to Martin Machine Co., Kewanee, Illinois, U. S. A.

MARTIN Trailer

KEWANEE ILLINOIS, U. S. A.

Copper Mines

Continued from page 19

two towns is now being whipped as the rough country road is transferred to the Arizona State Highway Department for improvement.

One of the most serious problems about maintaining a city of this size is a dependable water supply. Formerly a few deep wells supplied the towns, but the water table dropped in dry years. Kennecott officials and engineers corrected the trouble for years to come by designing and constructing a concrete dam high on Mineral Creek about the towns. The dam was built by Isbell's crews and equipment. It is capable of storing 540 acre-feet of water. It conserves winter and summer rains for use in the slack periods between moisture, and appears to have solved the problem for years to come. There is no longer any restriction on the watering of lawns and other such uses of water.

Future Operations

The Ray Mines Division plans to change over its mining and stripping excavation from contract to complete company operations upon delivery of major equipment items, such as power shovels, haulage trucks, drills, and the many other auxiliary construction units necessary for efficient open pit mining operations.

The Ray mine is operated under Kennecott's Western Mining Divisions, in Salt Lake City, Utah, headed by Louis Buchman, general manager. Ray operations are under the supervision of General Manager A. P. Morris. The Isbell Construction Co. is headed by its president, Mr. C. V. Isbell, and field construction was directed by General Superintendent Furman Byars.

Dozer Saw

Continued from page 23

Dam will indirectly make possible the eventual irrigation development of about 120,000 acres of land. The 72 million kilowatt-hours of electrical energy to be generated annually at the 15,000-kilowatt Boysen Power Plant will help to relieve a critical power shortage in the Big Horn Basin. The development, which is a part of the Missouri River Basin project, also will provide for the control of floods and silt and the expansion of recreational possibilities and fish and wildlife habitat.

The lake formed by the 220-foot-high earthfill dam will cover a total area of 19,660 acres and will have a normal operating pool of 820,000 acre-feet of water. Additional storage of 673,000 acre-feet will be provided for control of floods. Work on the 1,000-foot-long dam started in the fall of 1947 and is scheduled to be completed this year. The power plant is expected to be in operation next spring.

Reprinted through courtesy of Reclamation Era

New trade literature

Title: Crawler Fleet Applications

Subject: Fleet applications of International diesel crawler tractors are presented pictorially in an 8-page folder just published. In addition to the fleet scenes in the earth moving, mining, pipelining and lumbering fields, the folder also contains a brief listing of the mechanical features of the 148 drawbar horsepower crawler.

Where to get: International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. (Form CR-107-A).

Title: Hammer Bits

Subject: Two color folder on the manufacturer's carbide tipped hammer bit. The folder shows and tells users how Thunderbolt bits perform when drilling holes, under a variety of conditions, in hard concrete or granite. Also included are specification lists for the manufacturer's standard lengths, extra long lengths, and chuck wrenches.

Where to get: New England Carbide Tool Co., Inc., Cambridge, Mass.

Title: Storage Bins

Subject: Storage bins and loading bins are covered in a new pamphlet just released. Sizes, specifications and applications are covered, together with the types of bin gates available for discharging the bins. Included are specifications for single and multiple compartment bins up to 45 yards capacity.

Where to get: Pioneer Engineering Works, 1515 Central Ave., Minneapolis 13, Minn.

Title: Belt Conveyor Idlers

Subject: New book known as Bulletin No. 51-81 contains information on all of the latest designs and developments of manufacturer's equipment. There is a large cross-section showing steel and cast gray iron idler rolls. There are two pages of general engineering information to help in designing and specifying belt idler equipment. The latest information on the new Rex No. 33RA return belt training (self-aligning) Idler is given, together with material on the new No. 40 and 46 steep-angle troughed belt idlers and No. 33G and 33WC steep-angle troughed belt training idlers. Latest data

on lubrication material and techniques is included. A detailed description of zipper bunker seals is included plus data on belt conveyor trippers. A section of the book contains useful information on correct maintenance procedure.

Where to get: Chain Belt Co., Dept. PR, 1600 West Bruce St., Milwaukee 4, Wis.

Title: **Commercial Standard on Wire Rope**

Subject: Printed copies of the Spanish translation of Commercial Standard CS154E-49 covering wire rope for export trade are now available. This standard covers material requirements, constructions, methods of test together with definitions, safety factors and glossary of terms useful in the mutual understanding between buyer and seller of wire rope in export trade. Standard constructions and grades of wire rope and strand, highway guard cable, aircraft cord, elevator rope and bridge rope are shown. The booklet also includes a brief history of the project, a list of the acceptors and the membership of the Standing Committee, the chief function of which will be to consider revisions of the standard to keep it abreast of progress in the industry.

Where to get: Superintendent of Documents, Govt. Printing Office, Wash. 25, D. C. (CS154E-49 20¢) A discount of 25% will be allowed on orders for 100 or more copies sent to a single address.

Title: **Construction With Payloaders**

Subject: A 12-page catalog in color with on-the-job photos showing a wide variety of earth-moving, material-handling, lifting and carrying jobs being performed by the manufacturer's tractor-shovels. Helpful job data, specifications and features of the complete line are included, also illustrations of useful accessories such as backfiller blades, crane hooks, snow plows and fork lifts.

Where to get: The Frank G. Hough Co., 708 Seventh St., Libertyville, Ill. (catalog No. 217)

Title: **Company Brochure**

Subject: A 24-page, illustrated brochure on the company and its products has just been published by Leece-Neville Co., manufacturers of electrical equipment for diesel, gas and gasoline engines. The brochure outlines the part played by the manufacturer in this field. This is followed by pictorial sections on the company's production, assembly,

MOVE MORE YARDAGE... at less cost.. with a one-man

This Sauerman scraper—driven by a 200 hp. motor—reaches 500 ft.—digs through a deep bed of gravel—moves 250 cu. yd. of material an hour to screening plant.

SAUERMAN MACHINE

There's one sure way to cut costs on long range material handling—use a machine that does the whole job without help—a machine that digs, hauls and dumps in one continuous cycle.

Sauerman excavators are of two main types—power drag scrapers and slackline cableways. Either of these two machines will span a large area and move material at a rapid rate from point to point anywhere within that area, under finger-tip control of one operator.

The Sauerman power drag scraper is a general purpose excavator and stockpiler. The slackline cableway finds its greatest usefulness when the job calls for digging deep, particularly under water, and lifting to a high delivery point.

Simple, Economical, Versatile

Both machines are alike in their simplicity, ease of operation, moderate power requirements, low maintenance expense and their ability to work on any kind of ground.

Every Sauerman machine is carefully engineered and constructed to give long, trouble-free service and to stand up under tough digging and heavy loads. Many Sauerman machines in operation today have been running for more than a quarter of a century and still are considered just about as good as new by their owners.

Literature and Advice

Write today for our catalog. If you have a material handling problem that is bothering you, tell us about it and our engineers will give you their ideas as to the equipment and methods best suited to your requirements. This service is free and without obligation.

HILLSIDE EXCAVATION

The picture shows how a Sauerman scraper digs into a hill of hard-packed glacial gravel and moves the gravel to a crushing and screening plant.

STOCKPILING SIMPLIFIED

Small Sauerman scraper handles seasonal storage of 30,000 tons of surplus output annually at crushing plant, piling the surplus material in a single long pile and later reclaiming to a car-loading hopper.

DIGGING UNDER WATER

Here is a Sauerman slackline cableway moving gravel out of a deep pit 400' wide by 900' long which it dug during the last two seasons while producing about 300,000 cu. yds. a season.

Rope Haulage Equipment Specialists Since 1909

SAUERMAN BROS., Inc.

574 S. Clinton St. Chicago 7, Ill.

testing and engineering facilities. The booklet shows typical equipment made for buses, trucks, industrial engines, off-highway equipment, passenger cars, rail, marine and aircraft. Included are AC-DC alternator systems, generators, starting motors, hand and magnetic switches, and voltage regulators.

Where to get: Leece-Neville Co., Cleveland 14, Ohio.

Title: **Work-Horse Power**

Subject: Booklet contains complete specifications and available attachments for each of 12 sizes of Caterpillar Diesels.

Where to Get: Caterpillar Tractor Co., Peoria 8, Ill. (Form 30180)

Title: **Skullgard Safety Hat**

Subject: To stimulate wearing of protective hats, Mines Safety Appliances Co., has published a new illustrated booklet which will be given with every new safety hat. The booklet points out the vital importance of adequate head protection by listing representative examples from the manufacturer's files where workers have escaped serious injury and even death when struck by falling objects while wearing Skullgards. Cited are: a shipyard worker who was struck by a sledgehammer; a steel worker hit by a falling steel wedge; a boilermaker struck by a casting; a metal miner hit by a 35-lb. rock; a construction worker struck by a drill which had plummeted 80 feet; a tunnel worker who was under a 10-ft. timber which had fallen from the roof 50 feet above him; a mine shaftman struck by a rock which fell on him from 350 feet above his head; and a structural steelworker whose Skullgard was hit by a falling driftpin. A section of the booklet is devoted to the care of the Skullgard. Proper precautions which prolong the life of the protective hat are shown and important design features of a protective hat are also discussed.

Where to get: Mine Safety Appliances Co., Braddock, Thomas, and Meade Sts., Pittsburgh 8, Pa.

Title: **Management and Foremanship Manuals**

Subject: Three new management and foremanship manuals, Methods Improvement and The Foreman, Human Relations and The Foreman, and Safety and The Foreman are now being published. These manuals make up volumes seven, eight and nine of their Standard Management Practice Series, which will consist of twelve volumes in all. As each volume is basically independent of the other, the publishers are making the separate manuals available.

Where to get: James F. Mathias, National Foremen's Institute, Inc., New London, Conn. ($3.00 each)

Title: **Dipper Specifications Catalog**

Subject: Catalog No. 189 describes and illustrates all types of the manufacturer's dippers. Included are the general purpose cast-welded dipper, all-cast manganese steel dipper, coal-loading dipper and the Fastback hoe dipper. Model illustrations, specifications and job recommendations are also included.

Where to get: Electric Steel Foundry, 2141 N. W. 25th Ave., Portland 10, Ore.

Title: **Chains and Sprockets**

Subject: A new catalog of stock roller chains and sprockets has recently been announced. The catalog, No. C 55-50, gives details on list prices, available sizes of types A, B, and C Morse stock sprockets, and pertinent information on manufacturer's stock roller chain from ⅜ inch pitch to 2 inch pitch. Also included are data

WELLMAN *Williams Type*

MORE YARDAGE PER DAY

● Elimination of excess materials and careful weight distribution permit rapid, rhythmic operation of Wellman Dragline Buckets. Operators can cover a wider digging radius with this streamlined bucket.

Built of special alloy steel, using strong welded design, Wellman buckets provide strength and stamina for long-term economy. Perforated designs also available. You'll do better with Wellman.

Want Facts? Write for free descriptive bulletins

Dragline, Clamshell, Custom-Built Buckets Stone and Wood Grabs

THE WELLMAN ENGINEERING COMPANY
7000 Central Avenue
Cleveland 4, Ohio

on drive selection, service factors, installation, and service.
Where to get: Morse Chain Co., 7601 Central Ave., Detroit 8, Mich.

Title: **Technical Data Books**
Subject: A series of 10 new and completely revised dollar data books for engineers in the following Construction fields: Architecture, No. 601; Builders' Data, No. 628; Building Construction & Design Aids, No. 648; Highway Engineering, No. 611; Hydraulics, No. 612; Lumber Data, No. 631; Reinforced Concrete, No. 618; Steel Forms and Shapes, No. 622; Surveying Tables, Surveying Theory & Practice, No. 623. All of these books are pocket size, contain approx. 140 loose leaf pages of selected data and sell for $1.00 postpaid. Catalog with more than 2,000 listings sent free.
Where to get: Lefax, Phila. 7, Pa.

Construction Accidents

Continued from page 27

to swamping of life boat in rough sea.

Excavations—8% of all fatalities

1. Miner crushed by fallout of material from roof during tunnel mucking operations. (Working in unprotected area.)
2. Trench caved in, burying a laborer placing shoring. (Overloading bank—improper type of shoring.)
3. Foreman removing forming from a footing excavation when rain-soaked bank caved in on him.
4. Shovel working in deep cut when heavy slide occurred. Operator attempting to escape trapped in the slide.

Conclusions

a. The fatalities resulted from known hazards and improper procedures long recognized in the construction field. Repetition of similar cases indicates that definite planning is necessary to ensure that corrective actions will be followed. Supervisors' responsibilities for operating the safety program should be defined for all levels.
b. In most cases there is very little association between the employee's job designation and the type of hazards involved. Job safety must be broadened to include the hazards generally associated with each employee's occupation.
c. To cope with the dangers of mechanical operations, rigid enforcement of proved safety controls must be applied.

How to DOUBLE EFFICIENCY of your snow removal equipment

(Don't get caught again)

Last winter's big snows proved beyond doubt that La Crosse trailers can practically double the efficiency and working range of slow-moving snow plows, dozers, loaders, etc. By purchasing extra trailers now, you can move your big equipment where it's needed FASTER . . . get it working QUICKER . . . on to other jobs WITHOUT COSTLY DELAYS. Moreover, you keep your investment low . . . have extra trailers for year-'round utility.

You'll find heavy-duty La Crosse low boys especially well fitted for winter hauling because they *trail easier on slippery roads . . . are easier to load and unload . . . have extra-capacity, flat-platform gooseneck for carrying spare tires, sand, cinders, etc.* Choice of single, dual or tandem axle design from 6 to 67 tons capacity—standard or custom-built. May we discuss your requirements . . . now?

LC-9R

Check Today!

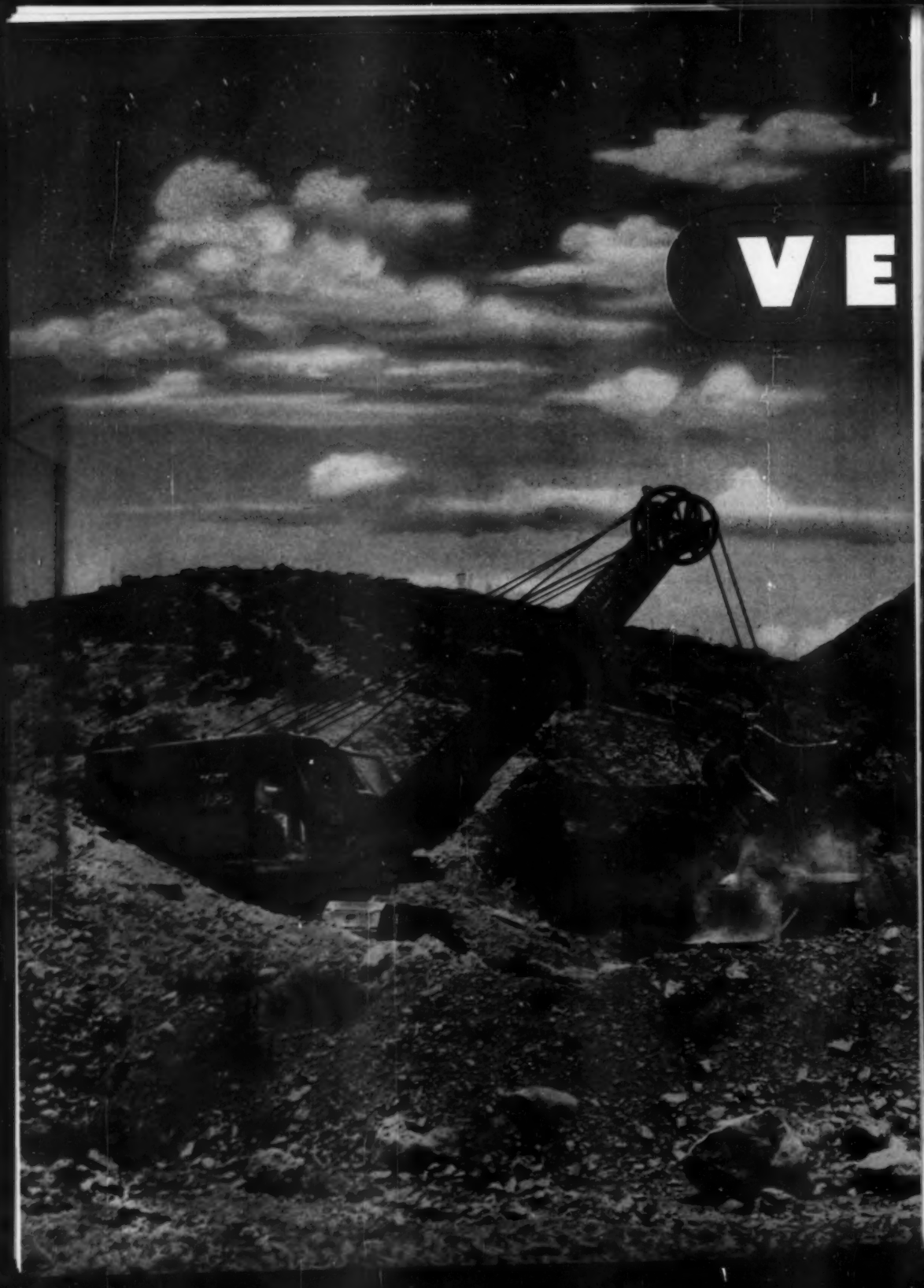
LA CROSSE TRAILER CORPORATION, La Crosse, Wis.

Send full details on La Crosse ☐ Tilt Trailers ☐ Standard Low Beds

We may be interested in a.....ton trailer about.....
for hauling.....
(Type of load)

Name.....
Occupation or business.....
Address.....
City.....State.....

LaCROSSE
America's Favorite LOW BED TRAILER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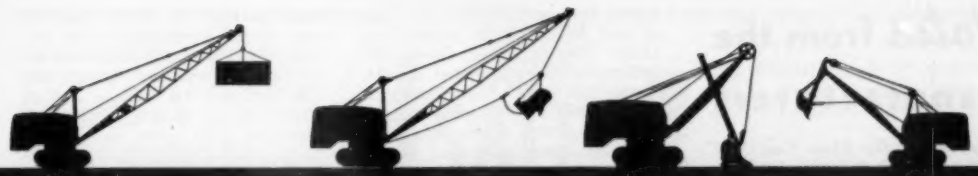


RSATILITY

Mark of a Preferred Excavator

THE ability to handle dozens of jobs with peak efficiency on each . . . that's one of the marks of a preferred exacavator. And that's one reason why Bucyrus-Eries are favorites of owners and operators the country over.

Take the 1½-yard Bucyrus-Erie 38-B as an example. Its wide-spread mounting and ground gripping treads mean superior stability for fast crane, dragline, shovel or dragshovel service. Its compactly designed, easily accessible main machinery makes conversion simple, facilitates maintenance. Large, high-capacity clutches and brakes meet all demands of excavator and crane service, feature easy-to-make, long-lasting adjustments. "Full-feel" controls mean fast, accurate operation, the operator always in touch with the load.

These and many other features combine to provide the versatility of the 38-B and other machines in Bucyrus-Erie's outstanding ⅜- to 4-cubic yard line of gasoline, diesel and single-motor electric excavators. Top-notch performance with any front-end equipment is one more reason why Bucyrus-Eries are

Most Compared

Most Preferred

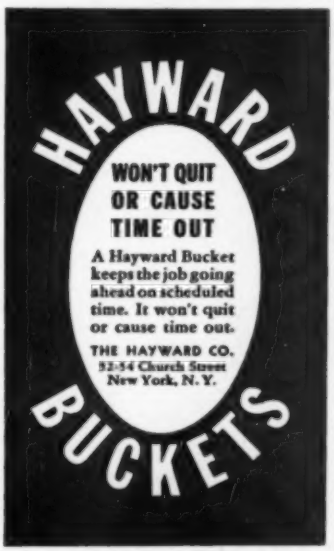
BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

Notes from the manufacturers

American Brake Shoe Co., NYC, has appointed Robert S. Bubb as marketing engineer. Mr. Bubb has been engaged in a wide range of sales, marketing and management engineering activities since graduating from Yale University in 1932. Before joining the company, he was a management engineer with Robert Heller & Associates, and worked on railroad, government and industrial assignments. Mr. Bubb will devote his time to studying the distribution methods of the company's ten operating divisions.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed McCormick Machinery Co., 6501 East Admiral Place, Tulsa, Okla., as distributor in eastern Oklahoma and the State Tractor & Equipment Co., 407 South 17th Ave., Phoenix, Ariz., as distributor for the entire state of Arizona. Both of these companies will handle Bucyrus-Erie ⅜- to 4-yd. gasoline, diesel, and single motor electric convertible excavators; 2- and 3-ton Hydrocranes and the recently introduced Hydrohoe. McCormick Machinery Co. also will handle the Red Arch dragline buckets. McCormick's territory for Bucyrus-Erie machines will be approximately the eastern half of Oklahoma: that part of the state east of and including the counties of Osage, Pawnee, Payne, Creek, Okfuskee, Seminole, Pontotoc, Garvin, Carter and Love. State Tractor & Equipment Co. will continue to handle Bucyrus-Erie tractor equipment — Bull-graders, bulldozers, Dozer-Shovels and scrapers designed for use with International crawler tractors. Supporting sales with outstanding service has always been the policy of these companies. Experienced personnel are anxious to assist contractors with information or advice on earthmoving problems or equipment.



B. F. Goodrich Co., Akron, Ohio, announced that Ira G. Needles, vice president of the B. F. Goodrich Rubber Co. of Canada Ltd., Kitchener, Ontario since 1945 has been elected company president. Mr. Needles succeeds George W. Sawin, president since 1941 who resigned on June 30 for reasons of health. Mr. Needles joined the company in 1916 and in 1925 became a member of B. F. Goodrich of Canada. He was assistant sales manager of the tire division until 1930 when he was made general tire sales manager. He was elected vice president-sales in 1945. The company has also appointed Edgar T. Gregory as manager of flat belting sales. Gregory was succeeded as operating manager of the industrial products sales dept. by Donald E. Schlemmer. With the company seven years, Gregory started as a senior sales development man in his division, and had been operating manager since 1945. He is a graduate of Western Reserve University, Cleveland.

Allstate Welding Alloys Co., Inc., White Plains, N. Y., has announced that Mr. Walter E. Palmer of Cresskill, N. J., has been appointed regional manager for New Jersey, eastern Pennsylvania, Maryland, Delaware and the District of Columbia. Mr. Palmer will be responsible for sales and service to the users and distributors of the manufacturer's products in his area and as the contact man for metallurgical resources and experimental laboratory will provide technical assistance for the solution of all manner of problems having to do with the welding, brazing, soldering, tinning and cutting of metals for maintenance, reclamation, construction and production of metal parts and equipment. Previous to joining the All-State organization, Mr. Palmer was eastern manager for Hollup Corp., field sales manager for Alloy Rods Co. and special representative for McKay Co. Throughout his career he has worked with and through distributors and has made a host of friends in the welding supply business.

Worthington Pump and Machinery Corp., Harrison, N. J., has announced the appointment of Mr. Herbert E. Gallison as manager of the industrial mixer sales division with headquarters at the Dunellen, N. J. plant. He succeeds Mr. J. C. Lukas who has resigned. Mr. Gallison was graduated from the University of Maine in 1931 with a B.S. degree in Mechanical Engineering. Prior to joining Worthington in 1946, he was engaged in selling for several heavy machinery manufacturers. He joined Worthington's construction equipment division as sales engineer in the southeastern region in 1946, becoming assistant to the regional manager of the central region in 1947, and central region supervisor of the industrial mixer division in 1949.

Caterpillar Tractor Co., Peoria, Ill., has announced five promotions in the general sales department. C. E. Jones, formerly manager of the sales development division, is now parts manager in charge of planning and development work for the parts department. George P. Fenn, former assistant manager of sales development, was named manager of the division while Robert D. Evans, the division's supervisor of tractor and equipment operation, was appointed assistant manager. Changes in the central sales division concern John M. Abbey, who transfers from assistant sales manager of that division to assistant sales manager, industrial division, and N. F. Sattem, presently a district representative, who will replace Abbey as the assistant sales manager of the central division.

Pioneer Engineering Works, Minneapolis, Minn., has announced the appointment of A. J. (Joe) Belanger as assistant sales manager. Mr. Belanger is well known in the road construction industry, particularly among asphalt paving contractors, with whom he has worked since 1948 as bituminous sales engineer for the company. Prior to his assignment to the sales department, he spent six years in the engineering department, engaged principally in the design and development of the company's continuous process hot-mix central plants. His undergraduate

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date — 15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LIMA 1201 DRAGLINE, diesel powered and equipped with 100 ft. boom and 3½ yard Hendrix bucket. Although four years old, machine has had little use and is in excellent condition.

W. J. Meagher & Sons
24th and Water Sts., Bay City, Michigan
Phone 9811

Lima 1201 — 2½ yard diesel shovel including spare dipper and handle. Three years old, good operating condition. Located Northern Minnesota. Box 3458

Used Bucyrus-Erie 320-B shovel. Good operating condition. Midwestern location. Inquire Box 3452 c/o Excavating Engineer.

FOR SALE

750-B BUCYRUS-ERIE 16 cu. yd. electric shovel, full Ward-Leonard.

This machine will become available in September, 1951. Good stock of spare parts. Located in Middlewest. Inquiry Box No. 3438, c/o EXCAVATING ENGINEER.

Bucyrus-Erie model 54-B stripper front—excellent condition.
Lima 2½ yard Hi-Lift shovel—new November 1949. Excellent condition.

Brandeis Machinery & Supply Co.
US Hi-Wa 41 N. at Diamond Ave.
Evansville, Ind.

Bucyrus-Erie model 29-B shovel and backhoe combination complete with Caterpillar D-8800 engine. Good condition. Price $11,000 F.O.B. Kentucky.

Brandeis Machinery & Supply Co.
Brook & Warnock Sts. Louisville, Ky.

¾ yd. Speeder shovel LS80.

4—Koehring Dumptors Model W-55 with Case gasoline power units.

2—Koehring Dumptors Model W-55 with Cummins diesel power units.

E. C. Schroeder Co., Inc.
McGregor, Iowa

BUCYRUS-ERIE 54-B. Stripper Serial 42968. 855,000. Northern W. Va.

Mullett Coal Company
1558 Electric Ave. East Pittsburgh, Pa.

Bucyrus-Erie 22-B shovel attachment, new, unused; contact D. D. Kennedy, Inc., P. O. Box 278, Bellwood, Illinois, or phone Hillside 2520.

Northwest model 25; 6; 80D; 95. Manitowoc 4500; 4500 new — will rent. Bucyrus 54-B; Monighan, 5W; 7W; 9W; 450.

A. W. Nevers Phone 32 Mt. Pleasant, Iowa

Bucyrus-Erie model 15-B ⅛ yd. shovel w/International UD-9 diesel engine. Machine is four years old. Good condition. Sale Price F.O.B. Louisville, Ky. $11,500.

Brandeis Machinery & Supply Co.
Brook and Warnock Streets Louisville, Ky.

Sauerman 2-cubic yard Crescent light weight scraper bucket complete with teeth, model U.S.-780. Used one week. Price—$1311 f.o.b. Mulberry, Florida.

R. H. Clark Equipment Co., Inc.
Mulberry, Florida

Three 16-yard LaPlant motor scrapers. Late models. Oversized tires. A-1 condition. Large parts inventory.

Harmon Creek Coal Corp. Pittsburgh, Pa.

P&H 955 diesel crane, on cats, 4-yd. bucket, 70' boom, 28' high cab, for boats.
Whirley electric elevated gantry cranes (3).
Shovels, draglines: B-E 200B, 120B, 54B, 52B, 50B, 80B, 37B; Marion #5320, 40A.
Rear & bottom dump Euclids, 15, 22, 32 tons.
Locomotives, 7 to 45 tons, gas, diesel, stm.
Hydrocranes, #3 and #2, with trucks & bkts.
Concrete aggreg. batch bins; mixing plants.
Crushers, 24x36, 36x48, 48x60; 16", 27", 30" gyr.
Buckeye and Parsons trench excavators (6).
Derrick boat, 15-ton, 1950 wood hull, steam.
Ind.-BH 35-ton loco. crane, steam (oil).
B-Erie shovel front att., 2¼-yd., 52B-55B.
H. Y. Smith Co., 828 N. B'way, Milw. 2, Wis.

SCRAPER BARGAIN

Five B-170 Bucyrus-Erie scrapers. 15 yard capacity. New 1950. Unused.

Ryan Construction Company
800 East Michigan Street
P. O. Box 34
Evansville, Indiana

1-cubic yard Marion shovel front and bucket—Model 340—Year 1935—Price $500.

Catskill Mountain Stone Corporation
Cairo, New York

POSITIONS WANTED

Position wanted as shovel, dragline, clamshell or pile driver operator. Have operated gas, steam and diesel large and small machines. Prefer steady work. P. O. Box 8, Hurricane, West Virginia. Phone 2224-Hurricane.

Coal strip-mine superintendent. 17 years experience as engineer and superintendent. Supervisory experience on all types of shovel and dragline, from ¾ to 45 cu. yds. Willing to go anywhere in U. S. Will furnish references if requested. Write 762 East Market Street, Cadiz, Ohio or phone 467-X.

If you are Buying or Selling Used Equipment this is the place to let the Excavating Industry know about it.

studies in engineering and education were followed with a Master's degree from the University of Minnesota in 1941.

Cleco Division of the Reed Roller Bit Co., Houston, Texas, has announced the appointment of Highway Machinery & Supply Co., Inc., 1724 Altamont Ave., Richmond 21, Va.; Sterling Sales, Inc., 787 Main St., Worcester 3, Mass.; and Wallner Welding Supply Co., 315 So. First St., Duluth, Minn., as distributors for Cleco products in their areas. Cleco manufactures the Cleco and Dallett lines of air tools and accessories—including tools for construction, manufacturing, metal fabrication, foundries, industrial maintenance and stone carving.

Athey Products Corp., Chicago, Ill. has announced the establishment of a contract manufacturing division. According to B. F. Lease, the company president, the demand for large quantities of heavy construction and industrial equipment, both for direct defense work and for supporting industries, which requires that all available heavy manufacturing facilities be pressed into service, has necessitated creation of the new division. Since the termination of World War II, Athey has acquired the land and buildings adjacent to its plant, increasing its building facilities and land area which helped to make entrance into the contract manufacturing field possible. The new department, a part of the general sales division, will be headed by T. V. Shea, general sales manager, who will be assisted by L. R. Davis.

United Mfg. Co., Bedford, Ohio, announced the appointment of Joseph N. Ryder to sales manager. The new 37-year old sales manager is a graduate of Cornell. He has formerly held the positions of sales representative for the Consolidated Iron and Steel Corp., eastern sales manager for the Pittsburgh Valve Corp., sales manager for the Arizona Engineering Corp., and has been affiliated with the United Manufacturing Co. for approximately one year. As sales manager for the United Manufacturing Co., Mr. Ryder will supervise the sale and distribution of all of the company's products. These include the Caravan line of two and four-wheel axles for the industrial field to provide portability for compressors, pumps, welding generators, etc., to the complete line of farm wagons, trailer axles, surge-control braking units, and accessory equipment currently marketed.

Joy Manufacturing Co., Pittsburgh, Pa., has made the following appointments: The McCormick Machinery Co., 6501 E. Admiral Pl., Tulsa, Okla., as distributor of construction equipment for the Tulsa area; The Townsco Equipment Co., 1704 N. E. 6th St., Oklahoma City, Okla., as distributor for the Oklahoma City area; and Oehlert Tractor and Equipment Co., Inc., 201-03 W. Pacific, Salina, Kans., as distributor for the Salina, Kans. area. The Oehlert organization maintains branches at Hays and Colby, Kans. All will handle the Joy line of portable air compressors, wagon drills, rock drills, paving breakers, spaders, tampers, and portable hoists.

Pettibone Mulliken Corp., Chicago 51, Ill., has announced a major reshaping of the sales policies of most of its companies. This reshaping involves part of the sales organizations of Pettibone Mulliken Corp., Hammermills, Inc., Universal Engineering Corp., and George Haiss Mfg. Co., Inc. Positions have been created for a director of sales and an assistant director of sales. Their functions shall be to determine and formulate the sales policies of the various companies and coordinate all selling and advertising activities. W. E. Madden, formerly vice president of George Haiss Mfg. Co., Inc., has been named director of sales and J. M. Hume, formerly vice president of Universal Engineering Corp., has been named assistant director of sales.

Mobile Plant

Continued from page 21

own trailer homes with their families, including Clark himself and Charlie Nohava, his superintendent. The 21 children in the camp go to whatever local schools are closest. Nohava's two children are both a grade ahead in spite of all the moving.

The balance of the crew lives in large bunk house trailers belonging to Clark. These men eat in a large commissary trailer.

Clark and his men always manage to pick a hill near the job for the site of their trailer village to better keep an eye on the weather. Electric power for the camp is furnished by a 20-kw outfit. Water for the village is provided from a trailer-mounted, 350-gal. tank.

Clark's next job is on a 5-mile stretch of U. S. highway No. 16 near Kadoka, S. D., and includes stockpiling 5,000 tons of gravel for future maintenance along this road.

A WEIGHT LIFTING CHAMP
No matter what size Omaha bucket you choose, you'll find a champion weight lifter. There's extra strength for the tough digging job—surplus weight eliminated; a bigger payload built in. Omaha buckets fill quicker, dump cleaner and stand up better on every job. Available in four types.
Write today for catalog giving complete description and specifications.
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LAY-SET PREFORMED

the Premium BRAND

Only the finest is branded *"Premium."* Only the best gets the blue ribbon for unequalled quality. Only one is recognized as the grand champion winner which sets the standards of excellence . . . whether it's beef on the hoof, a beauty contest winner, or a brand of wire rope.

HAZARD since 1846 has produced premium wire rope . . . made better so that it will last longer, handle safer, and cost less to use. LAY-SET Preformed has been used —with excellent results—in every conceivable type of wire rope service. Its satisfactory performance has proved LAY-SET's right to be called—*"the Premium Brand."*

There is a HAZARD distributor near you to serve you with the premium brand of wire rope.

ACCO *Its Business for Your Safety*

AMERICAN CHAIN & CABLE
HAZARD WIRE ROPE DIVISION

ALSO MAKERS OF THE COMPLETE LINE OF Registered WIRE ROPE SLINGS

TRADE MARK

Wilkes-Barre, Pa. · Chicago · Denver · Houston · Los Angeles · New York · Odessa, Tex. · Philadelphia · Pittsburgh · San Francisco · Bridgeport, Conn.

Overburden is less burden for stripping shovel on TIMKEN® bearings

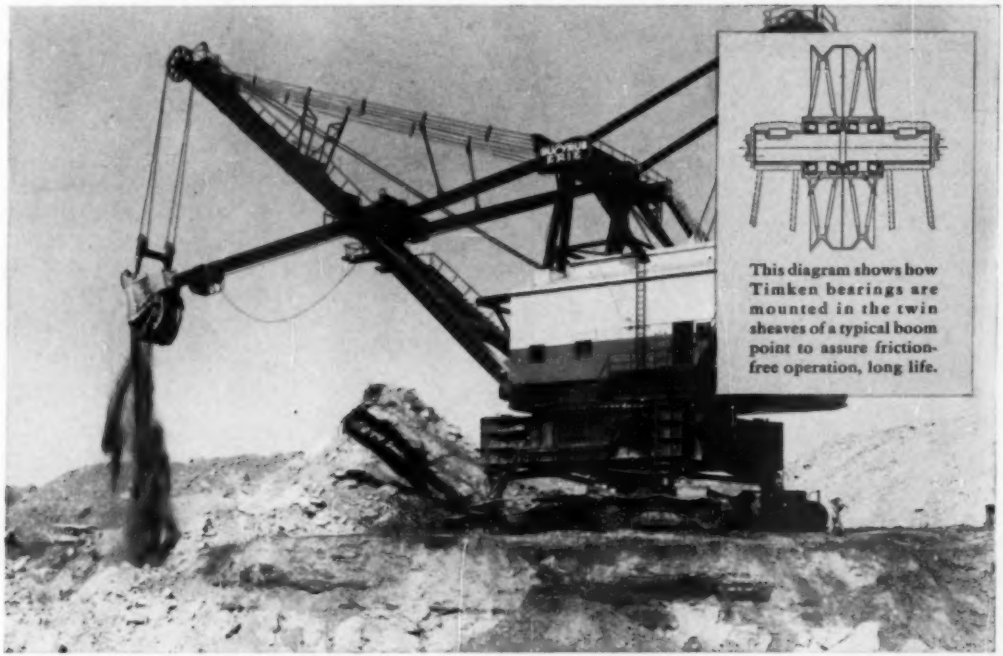
THIS Bucyrus-Erie model 1050-B stripping shovel picks up as much as 36 cubic yards of overburden at a bite. With a total of 30 Timken® bearings on swing machinery, main machinery, crowd machinery, counterbalanced hoist and boom point sheaves, heavy loads are handled easily—with a minimum of wear and maintenance.

Timken tapered roller bearings carry both radial and thrust loads in any combination. Line contact between rollers and races gives extra load carrying capacity. Shafts, gears and sheaves are held in proper alignment, reducing wear. The true rolling motion and incredibly smooth surface finish of Timken bearings practically eliminate friction.

Lubrication time and costs are minimized because Timken bearings keep housing and shaft concentric, make closures more effective. Timken bearings normally last the life of the machine because (1) they are engineered for the job, (2) they are made of Timken fine alloy steel, (3) they are precision manufactured.

To get the benefit of the more than 50 years of bearing research and development, be sure to have Timken bearings on the machinery you build or the machinery you buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



This diagram shows how Timken bearings are mounted in the twin sheaves of a typical boom point to assure friction-free operation, long life.

DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roll ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN

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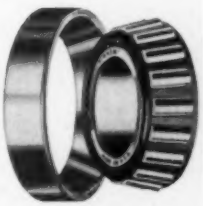
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬮ AND THRUST →⬮← LOADS OR ANY COMBINATION →✳←